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James Leonard Brierley Smith (1897 - 1968)
with their dog Marlin

The publication series (Monographs, Bulletins & Special Publications) of the SAIAB (formerly the JLB Smith Institute of Ichthyology), in its new format honors James Leonard Brierley Smith and Margaret Mary Smith with the name *Smithiana*, in recognition of their many years of devoted service to African aquatic biology. Their life's work, a team effort, established modern ichthyology in southern Africa and laid the groundwork for the expansion of aquatic biology throughout the region.

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Front cover photograph: *Manonichthys alleni* off northeastern Borneo. © Gerald R. Allen, 2003

Revision of the Indo-Pacific Dottyback Fish Subfamily Pseudochrominae (Perciformes: Pseudochromidae).

Anthony C. Gill [1]

ABSTRACT

Gill, Anthony C. 2003. Revision of the Indo-Pacific Dottyback Fish Subfamily Pseudochrominae (Perciformes: Pseudochromidae). *Smithiana Monograph 1,* 213 pages, 12 plates.

The 100 nominal species in the pseudochromid subfamily Pseudochrominae are referred to 70 valid species, and an additional ten species are described as new. These species are assigned to ten genera: *Assiculoides* Gill & Hutchins, 1997, *Assiculus* Richardson, 1846, *Cypho* Myers, 1940, *Labracinus* Schlegel, 1858, *Ogilbyina* Fowler, 1931, *Pseudochromis* Rüppell, 1835, and four new genera, *Manonichthys*, *Oxycercichthys*, *Pholidochromis* and *Pictichromis*. In previous recent studies only two genera, *Labracinus* and *Pseudochromis*, had been generally recognised; speeies assigned to the remaining genera had been previously placed in *Pseudochromis*. Species included in the subfamily are: *Assiculoides desmonotus* Gill & Hutchins, 1997 (Western Australia); *Assiculus punctatus* Richardson, 1846 (northwestern Australia); *Cypho purpurascens* (De Vis, 1884) (southwest Pacific); *C. zaps* sp. nov. (Indonesia to Ryukyu Ids); *Labracinus atrofasciatus* (Herre, 1933) (Culion, Philippines); *L. cyclophthalmus* (Müller & Troschel, 1849) (Japan to northwestern Australia, Papua New Guinea); *L. lineatus* (Castelnau, 1875) (Western Australia); *Manonichthys alleni* sp. nov. (Sabah, Borneo); *M. paranox* (Lubbock & Goldman, 1976) (Solomon Ids, Papua New Guinea, Great Barrier Reef); *M. polynemus* (Fowler, 1931) (northeastern Indonesia, Belau); *M. splendens* (Fowler, 1931) (southeastern Indonesia); *M. winterbottomi* sp nov. (Cebu, Philippines); *Ogilbyina novaehollandiae* (Steindachner, 1880) (southern Great Barrier Reef and Queensland); *O. queenslandiae* (Saville-Kent, 1893) (Queensland, Great Barrier Reef); *O. salvati* (Plessis & Fourmanoir, 1966) (New Caledonia); *Oxycercichthys veliferus* (Lubbock, 1980) (Great Barrier Reef, western Coral Sea); *Pholidochromis marginata* (Lubbock, 1980) (northeastern Indonesia to Bougainville); *Pictichromis aurifrons* (Lubbock, 1980) (New Guinea); *P. coralensis* sp. nov. (Great Barrier Reef to New Caledonia); *P. diadema* (Lubbock & Randall, 1978) (Malaysia to Philippines and northern Borneo); *P. ephippiata* (Gill, Pyle & Earle, 1996) (northern Sulawesi, southeastern Papua New Guinea); *P. paccagnellae* (Axelrod, 1973) (Indonesia, Timor Sea to Solomon Ids); *P. porphyrea* (Lubbock & Goldman, 1974) (Ryukyu Ids and northeastern Indonesia to Marshall Ids and Tonga); *Pseudochromis aldabraensis* Bauchot-Boutin, 1958 (Aldabra, northwestern Indian Ocean); *P. alticaudex* sp. nov. (northeastern Indonesia to Solomon Ids); *P. andamanensis* Lubbock, 1980 (Andaman Sea to Timor Sea, Australia); *P. aureolineatus* sp. nov. (Comoro Ids); *P. aurulentus* Gill & Randall, 1998 (Komodo Id, Indonesia); *P. bitaeniatus* (Fowler, 1931) (Philippines to Timor Sea, Australia, Solomon Ids); *P. caudalis* Boulenger, 1898 (Arabian Sea to Sri Lanka); *P. coccinicauda* (Tickell, 1888) (Laccadive Ids to central Indonesia); *P. colei* Herre, 1933 (Culion, Philippines); *P. cometes* Gill & Randall, 1998 (Komodo Id, Indonesia); *P. cyanotaenia* Bleeker, 1857 (Japan to Australia and Vanuatu); *P. dilectus* Lubbock, 1976 (Sri Lanka); *P. dixurus* Lubbock, 1975 (Red Sea); *P. dutoiti* Smith, 1955 (east coast of Africa); *P. elongatus* Lubbock, 1980 (eastern Indonesia); *P. flammicauda* Lubbock & Goldman, 1976 (Great Barrier Reef); *P. flavivertex* Rüppell, 1835 (Red Sea); *P. flavopunctatus* Gill & Randall, 1998 (Komodo Id, Indonesia); *P. fowleri* Herre, 1934 (Philippines and Sabah, Borneo); *P. fridmani* Klausewitz, 1968 (Red Sea); *P. fuscus* Müller & Troschel, 1849 (Sri Lanka to Vanuatu); *P. howsoni* Allen, 1995 (northwestern Australia); *P. jamesi* Schultz, 1943 (southwest Pacific); *P. kolythrus* Gill & Winterbottom, 1993 (New Caledonia); *P. kristinae* sp. nov. (east coast of Africa to Madagascar); *P. leucorhynchus* Lubbock, 1977 (Kenya to Oman); *P. linda* Randall & Stanaland, 1989 (Gulf of Aden to Pakistan); *P. litus* Gill & Randall, 1998 (southeastern Indonesia); *P. luteus* Aoyagi, 1943 (Ryukyu Ids to Philippines); *P. madagascariensis* sp. nov. (northeastern Madagascar); *P. magnificus* Lubbock, 1977 (Cargados Carajos Shoals); *P. marshallensis* Schultz, 1953 (Western Australia to Marshall Ids); *P. melanurus* sp. nov. (Fiji and Tonga); *P. melas* Lubbock, 1977 (east coast of Africa); *P. mooii* sp. nov. (Komodo Id, Indonesia); *P. moorei* Fowler, 1931 (Philippines); *P. natalensis* Regan, 1916 (east coast of Africa); *P. nigrovittatus* Boulenger, 1897 (Red Sea, Gulf of Aden, Socotra to Persian Gulf); *P. olivaceus* Rüppell, 1835 (Red Sea); *P. omanensis* Gill & Mee, 1993 (Oman); *P. persicus* Murray, 1887 (Persian Gulf to Pakistan); *P. perspicillatus* Günther, 1862 (Philippines and Indonesia); *P. pesi* Lubbock, 1975 (Red Sea); *P. pictus* Gill & Randall, 1998 (Alor Id, Indonesia); *P. punctatus* Kotthaus, 1970 (Somalia and southern Oman); *P. pylei* Randall & McCosker, 1989 (southeastern Indonesia and Belau); *P. quinquedentatus* McCulloch, 1926 (northern Australia); *P. ransonneti* Steindachner, 1870 (Gulf of Thailand to Seribu Ids, Indonesia); *P. reticulatus* Gill & Woodland, 1992 (northwestern Australia); *P. sankeyi* Lubbock, 1975 (southern Red Sea, Gulf of Aden); *P. springeri* Lubbock, 1975 (Red Sea); *P. steenei* Gill & Randall, 1992 (southern Indonesia); *P. striatus* Gill, Shao & Chen, 1995 (Philippines, Taiwan, Ryukyu Ids); *P. tapeinosoma* Bleeker, 1853 (Andaman Sea to Solomon Ids); *P. tauberae* Lubbock, 1977 (east coast of Africa to Madagascar); *P. viridis* Gill & Allen, 1996 (Christmas Id, Indian Ocean); and *P. wilsoni* Whitley, 1929 (northern Australia).

A key to genera and keys to species within genera are provided. Synonymy lists, suggested vernacular names, morphological descriptions, habitat notes, and distribution maps are given for each species. Photographs showing live and/or freshly dead colourations (including sexual and other intraspecific variation) are provided for all but a few species.

Dedicated to Beverley M. and George B. Gill, my mother and late father,
for the love, encouragement and support they have always given me.

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Revision of the Indo-Pacific Dottyback Fish Subfamily Pseudochrominae (Perciformes: Pseudochromidae).

Anthony C. Gill

INTRODUCTION

The Pseudochromidae (commonly known as dottybacks) are a group of mainly small (usually less than 10 cm SL), often brightly coloured, reef-associated fishes that are widely distributed throughout tropical and subtropical regions of the Indo-Pacific. Godkin and Winterbottom (1985) divided the family into four subfamilies: Anisochrominae, Congrogadinae, Pseudoplesiopinae and Pseudochrominae. Although these fishes were poorly known taxonomically and biologically, there has been an increased taxonomic understanding of pseudochromid fishes in recent years. Gill & Fricke (2001) revised the Anisochrominae and recognised one genus with three species from the western Indian Ocean. Winterbottom (1986) revised the Congrogadinae, recognising nine genera with 19 species; four additional species were described by Winterbottom and Randall (1994), Winterbottom (1996) and Gill, Mooi & Hutchins (2000), bringing the total number of species to 23. The Pseudoplesiopinae are poorly known, although a revision of this subfamily, recognising five genera and about 30 species, is in progress (Gill & Edwards, 1999, in press, in prep.).

The final subfamily, the Pseudochrominae, which is the largest and most confused taxonomically (with over 100 nominal species; Table 1), forms the subject of the present treatment. There is no comprehensive study of the Pseudochrominae. The most recent attempt was a literature review by Fowler (1931b). Although Fowler provided keys and diagnoses for all known species, his study is inadequate for species identification, because of the inaccurate nature of the diagnoses and the ambiguity of the keys. Since Fowler's review, the few revisionary works have been mainly restricted to regional studies.

The use of ichthyocides and SCUBA has greatly increased museum holdings of small cryptic reef fishes, including pseudochromines. A lack of adequate revisionary studies has meant that much of this material remains unidentified. The primary objective of the present study is to define the genera and species of the Pseudochrominae.

Historical Review

Much of the earliest literature on pseudochromines was restricted to new species descriptions, with little revisionary analysis. Rüppell (1835) first described the genus *Pseudochromis* based on two new Red Sea species, *P. olivaceus* and *P. flavivertex*. Bleeker's (1875) revision of Indonesian pseudochromids represented one of the first attempts at providing a synthesis for the family. He recognised five Indonesian species in *Cichlops* Müller & Troschel (1849), one of which with two varieties; and seven species in *Pseudochromis*. McCulloch (1926) gave a key to Australian *Pseudochromis*, recognising six species and describing sexual dimorphism in one of these. Fowler (1931b) presented the first extensive review of the Pseudochrominae; unfortunately it was based largely on literature accounts for many species. He provided keys, synonymies and diagnoses for all species. He recognised seven species in the genus *Dampieria*, two of which he described as new, and 23 species within *Pseudochromis*, three of which he described as new. Aoyagi (1941c) reviewed the pseudochromine fishes of the Ryukyu Ids recognising nine species, one of which he described as new. Lubbock published a series of papers revising the pseudochromine and pseudoplesiopine faunas of the Red Sea and northwestern Indian Ocean (Lubbock, 1975), the central Indian Ocean (Lubbock, 1976), and the western Indian Ocean (Lubbock, 1977). He recognised a total of 20 *Pseudochromis* species for the Red Sea and the central and western Indian Oceans, nine of which he described as new. Gill & Mee (1993) reviewed *Pseudochromis* species from Oman, described a new species from southern Oman, and referred to misidentifications in Lubbock's (1975) revision.

Swainson (1839) objected to Rüppell's generic name *Pseudochromis* and proposed a new name, *Labristoma*, as a replacement. Richardson (1846) added a new genus and species, *Assiculus punctatus*, from Australia, which he aligned near *Pseudochromis*. Müller & Troschel (1849) described another new genus and species, *Cichlops cyclophthalmus*, and erected the family Pseudochromidae to include *Pseudochromis, Cichlops*, and *Plesiops* Oken [now assigned to the Plesiopidae; see Mooi (1993, 1995) for an analysis of the limits of this genus and family].

Schlegel (1858) added *Labracinus* as a name in synonymy under an account of *Cichlopsis* (sic), although it is evident elsewhere (Hoeven, 1855: 386) that prior to becoming aware of Müller and Troschel's description of *Cichlops*, Schlegel had intended to describe his genus as new. Castelnau (1875) described a new genus and species, *Dampieria lineata*, placing it near *Assiculus* and *Ruppelia* Castelnau (= *Paraplesiops* Bleeker, family Plesiopidae; see Hoese & Kuiter, 1984) in the family Nandidae. Bleeker (1875), apparently unaware of Schlegel's publication of the name in synonymy, listed *Labracinus* as a synonym of *Cichlops* based on specimens labelled by Schlegel in the Rijks Museum van Natuurlijke Historie (now Nationaal Natuurhistorisch Museum), Leiden. In the same paper, Bleeker recognised a new subgenus of *Pseudochromis*, *Leptochromis*, which he differentiated on the basis of the relative development and apparent number of dorsal- and anal-fin spines. De Vis (1884) described a new genus and species, *Nesiotes purpurascens*, which he assigned to the Labridae. The following year he described an additional new genus and species, *Onar nebulosum*, which he tentatively assigned to the Pomacentridae (De Vis, 1885).

Gill (1904) noted that Müller and Troschel's *Cichlops* was preoccupied by the bird genus *Cichlops* Hodgson, 1844, and

Table 1. List of nominal pseudochromine species-group taxa (ordered alphabetically by specific epithet), including non-pseudochromid species that have been incorrectly assigned to pseudochromine genera, and their current allocations.

Nominal Species and Reference	Current Allocation
Pseudochromis adustus Müller & Troschel, 1849: 23	*Pseudochromis fuscus*
Pseudochromis aldabraensis Bauchot-Boutin in Arnoult et al., 1958: 80	*Pseudochromis aldabraensis*
Manonichthys alleni sp. nov.	*Manonichthys alleni*
Cichlops melanotaenia var. *altera* Bleeker, 1875: 8	*Labracinus cyclophthalmus*
Pseudochromis alticaudex sp. nov.	*Pseudochromis alticaudex*
Pseudochromis andamanensis Lubbock, 1980: 821	*Pseudochromis andamanensis*
Pseudochromis aurea Seale, 1910: 528	*Pseudochromis fuscus*
Pseudochromis aureolineatus sp. nov.	*Pseudochromis aureolineatus*
Pseudochromis aurulentus Gill & Randall, 1998: 18	*Pseudochromis aurulentus*
Pseudochromis aurifrons Lubbock, 1980: 824	*Pictichromis aurifrons*
Dampieria atrofasciatus Herre, 1933a: 17	*Labracinus atrofasciatus*
Malacocanthus bicolor Tickell in Day, 1888:791	*Pseudochromis coccinicauda*
Dampieria (Bartschina) bitaeniata Fowler, 1931b: 18	*Pseudochromis bitaeniatus*
Pseudochromis caudalis Boulenger, 1898: 134	*Pseudochromis caudalis*
Malacocanthus coccinicauda Tickell in Day, 1888: 791	*Pseudochromis coccinicauda*
Pseudochromis colei Herre, 1933a: 18	*Pseudochromis colei*
Pseudochromis cometes Gill & Randall, 1998: 19	*Pseudochromis cometes*
Pictichromis coralensis sp. nov.	*Pictichromis coralensis*
Pseudochromis cyanotaenia Bleeker, 1857: 72	*Pseudochromis cyanotaenia*
Cichlops cyclophthalmus Müller & Troschel, 1849: 24	*Labracinus cyclophthalmus*
Assiculoides desmonotus Gill & Hutchins, 1997: 45	*Assiculoides desmonotus*
Pseudochromis diadema Lubbock & Randall, 1978: 37	*Pictichromis diadema*
Pseudochromis dilectus Lubbock, 1976: 172	*Pseudochromis dilectus*
Pseudochromis dixurus Lubbock, 1975: 130	*Pseudochromis dixurus*
Pseudochromis dutoiti Smith, 1955a: 145	*Pseudochromis dutoiti*
Pseudochromis elongatus Lubboek, 1980: 826	*Pseudochromis elongatus*
Pseudochromis ephippiatus Gill, Pyle & Earle, 1996: 98	*Pictichromis ephippiata*
Cichlops filamentosus Macleay, 1881: 570	*Assiculus punctatus*
Pseudochromis flammicauda Lubbock & Goldman, 1976: 57	*Pseudochromis flammicauda*
Labracinus flavipinnis Seale, 1910: 530	*Pseudochromis tapeinosoma*
Pseudochromis flavivertex Rüppell, 1835: 9	*Pseudochromis flavivertex*
Pseudochromis flavopunctatus Gill & Randall, 1998: 20	*Pseudochromis flavopunctatus*
Pseudochromis fowleri Herre, 1934: 45	*Pseudochromis fowleri*
Pseudochromis fridmani Klausewitz, 1968: 444	*Pseudochromis fridmani*
Pseudochromis fuscus Müller & Troschel, 1849: 23	*Pseudochromis fuscus*
Cichlops hellmuthii Bleeker, 1854: 329	*Labracinus cyclophthalmus*
Julis horsfieldii Valenciennes in Cuvier & Valenciennes, 1839: 486	*Labracinus cyclophthalmus*
Pseudochromis howsoni Allen, 1995: 83	*Pseudochromis howsoni*
Dampieria ignita Scott, 1959: 75	*Labracinus lineatus*
Pseudochromis jamesi Schultz, 1943: 116	*Pseudochromis jamesi*
Cichlops japonicus Gill, 1859: 147	*Labracinus cyclophthalmus*
Pseudochromis kikaii Aoyagi, 1941c: 44	*Pseudochromis cyanotaenia*
Pseudochromis kolythrus Gill & Winterbottom, 1993: 2	*Pseudochromis kolythrus*
Pseudochromis kristinae sp. nov.	*Pseudochromis kristinae*
Pseudochromis leucorhynchus Lubbock, 1977: 6	*Pseudochromis leucorhynchus*
Pseudochromis linda Randall & Stanaland, 1989: 107	*Pseudochromis linda*
Dampieria lineata Castelnau, 1875: 30	*Labracinus lineatus*
Pseudochromis litus Gill & Randall, 1998: 22	*Pseudochromis litus*
Dampieria longipinnis Ogilby, 1908: 34	*Ogilbyina novaehollandiae*
Pseudochromis luteus Aoyagi, 1943: 103	*Pseudochromis luteus*
Pseudochromis madagascariensis sp. nov.	*Pseudochromis madagascariensis*
Pseudochromis magnificus Lubbock, 1977: 3	*Pseudochromis magnificus*
Pseudochromis marginatus Lubbock, 1980: 829	*Pholidochromis marginata*
Pseudochromis aurea marshallensis Schultz, 1953: 392	*Pseudochromis marshallensis*
Pseudochromis mccullochi Myers, 1932: 30	*Cypho purpurascens*

Nominal Species and Reference	Current Allocation
Dampieria (D.) melanostigma Fowler, 1931b: 16	*Labracinus cyclophthalmus*
Cichlops melanotaenia Bleeker, 1852: 765	*Labracinus cyclophthalmus*
Pseudochromis melanotaenia Bleeker, 1863: 273	*Pseudochromis tapeinosoma*
Pseudochromis melanotus Lubbock, 1975: 157	*Pseudochromis punctatus*
Pseudochromis melanurus sp. nov.	*Pseudochromis melanurus*
Pseudochromis melas Lubbock, 1977: 8	*Pseudochromis melas*
Pseudochromis mooii sp. nov.	*Pseudochromis mooii*
Pseudochromis (P.) moorei Fowler, 1931b: 39	*Pseudochromis moorei*
Pseudochromis mülleri Klunzinger, 1880: 370	*Assiculus punctatus*
Pseudochromis natalensis Regan, 1916: 167	*Pseudochromis natalensis*
Onar nebulosum De Vis, 1885: 875	*Pseudochromis fuscus*
Pseudochromis nigrovittatus Boulenger, 1897: 421	*Pseudochromis nigrovittatus*
Pseudochromis novaehollandiae Steindachner, 1880: 160	*Ogilbyina novaehollandiae*
Dampieria ocellifera Fowler, 1946: 130	*Labracinus cyclophthalmus*
Pseudochromis olivaceus Rüppell, 1835: 8	*Pseudochromis olivaceus*
Pseudochromis omanensis Gill & Mee, 1993: 57	*Pseudochromis omanensis*
Pseudochromis paccagnellae Axelrod, 1973: 5	*Pictichromis paccagnellae*
Pseudochromis paranox Lubbock & Goldman, 1976: 60	*Manonichthys paranox*
Pseudochromes persicus Murray, 1887: 49	*Pseudochromis persicus*
Pseudochromis perspicillatus Günther, 1862a: 193	*Pseudochromis perspicillatus*
Pseudochromis mccullochi perpulcher Whitley, 1959: 313	*Cypho purpurascens*
Pseudochromis pesi Lubbock, 1975: 136	*Pseudochromis pesi*
Pseudochromis pictus Gill & Randall, 1998: 24	*Pseudochromis pictus*
Pseudochromis polyacanthus Bleeker, 1856: 375	*Pseudogramma polyacanthum* (Serranidae)
Pseudochromis (P.) polynemus Fowler, 1931b: 38	*Manonichthys polynemus*
Pseudochromis porphyreus Lubbock & Goldman, 1974: 107	*Pictichromis porphyrea*
Assiculus punctatus Richardson, 1846: 494	*Assiculus punctatus*
Pseudochromis punctatus Kotthaus, 1970: 52	*Pseudochromis punctatus*
Nesiotes purpurascens De Vis, 1884: 453	*Cypho purpurascens*
Pseudochromis pylei Randall & McCosker, 1989: 8	*Pseudochromis pylei*
Polyacanthus queenslandiae Saville-Kent, 1893: 308	*Ogilbyina queenslandiae*
Pseudochromis (Leptochromis) quinquedentatus McCulloch, 1926: 190	*Pseudochromis quinquedentatus*
Pseudochromis ranjhai Klausewitz, 1961: 427	*Pseudochromis caudalis*
Pseudochromis ransonneti Steindachner, 1870: 562	*Pseudochromis ransonneti*
Pseudochromis reticulatus Gill & Woodland, 1992: 248	*Pseudochromis reticulatus*
Pseudochromis rex Seale, 1910: 529	*Pseudochromis perspicillatus*
Pseudochromis rodwayi Johnston, 1902: 6	*Trachinops caudimaculatus* (Plesiopidae)
Pseudochromis salvati Plessis & Fourmanoir, 1966: 227	*Ogilbyina salvati*
Pseudochromis sankeyi Lubbock, 1975: 145	*Pseudochromis sankeyi*
Pseudochromis similimus Herre, 1933a: 19	*Pseudochromis perspicillatus*
Pseudochromis spencei Fowler, 1929: 112	*Pseudochromis caudalis*
Cichlops spilopterus Bleeker, 1853b: 168	*Labracinus cyclophthalmus*
Pseudochromis (Klunzingerina) splendens Fowler, 1931b: 35	*Manonichthys splendens*
Pseudochromis springeri Lubbock, 1975: 128	*Pseudochromis springeri*
Pseudochromis steenei Gill & Randall, 1992: 42	*Pseudochromis steenei*
Pseudochromis striatus Gill, Shao & Chen, 1995: 79	*Pseudochromis striatus*
Pseudochromis swaini Herre, 1934: 46	*Pseudochromis fowleri*
Pseudochromis tapeinosoma Bleeker, 1853a: 115	*Pseudochromis tapeinosoma*
Pseudochromis tauberae Lubbock, 1977: 9	*Pseudochromis tauberae*
Cichlops trispilos Bleeker, 1855b: 110	*Labracinus cyclophthalmus*
Pseudochromis truncatus Stinton, 1980: 198	Serranidae?
Pseudochromis veliferus Lubbock, 1980: 831	*Oxycercichthys veliferus*
Pseudochromis viridis Gill & Allen, 1996: 34	*Pseudochromis viridis*
Pseudochromis wildii Ogilby, 1908: 34	*Pseudochromis fuscus*
Leptochromis tapeinosoma wilsoni Whitley, 1929: 113	*Pseudochromis wilsoni*
Manonichthys winterbottomi sp. nov.	*Manonichthys winterbottomi*
Pseudochromis xanthochir Bleeker, 1855a: 443	*Pseudochromis fuscus*
Cypho zaps sp. nov.	*Cypho zaps*

proposed that the name *Labracinus* Bleeker, 1875 be used for the genus instead. Although Gill correctly noted that Hoeven's (1855) use of *Labracinus* represented a *nomen nudum*, he overlooked Schlegel's (1858) publication of *Labracinus* in the synonymy of *Cichlopsis*.

Fowler (1931b) recognised three subfamilies in his revision of the Pseudochromidae: Pseudogramminae (now assigned to the serranid subfamily Epinephelinae; Johnson, 1983; Baldwin & Johnson, 1993), Pseudoplesiopinae and Pseudochrominae. Within the latter subfamily he recognised three genera: *Nematochromis* Weber [correctly referred by Schultz (1953) to the synonymy of *Pseudoplesiops* Bleeker; see also Gill et al. (1991: 75) and Gill & Edwards (1999)], *Dampieria* and *Pseudochromis*. Within *Dampieria* he recognised three subgenera, two of which, *Bartschina* and *Ogilbyina*, he described as new. Moreover, he regarded *Labracinus* as a junior synonym of *Dampieria*, wrongly attributing authorship of the former genus to Bleeker (1875). In addition, he divided *Pseudochromis* into four subgenera based largely on fin-ray counts and caudal-fin shape: *Assiculus*, *Pseudochromis*, and two new subgenera, *Devisina* and *Klunzingerina*.

Myers (1940) noted that *Nesiotes* De Vis, 1884 was preoccupied by the molluscan genus *Nesiotes* Martens, 1860 [also by *Nesiotes* Wollaston, 1861 (Coleoptera) and *Nesiotes* Staal, 1873 (Hemiptera)] and accordingly proposed *Cypho* as a replacement name. Böhlke (1960) produced a chronological list of all nominal pseudochromine genera. However, by following Gill (1904) in attributing *Labracinus* to Bleeker (1875), he believed that date priority would need to be resolved in order to determine seniority of *Labracinus* and *Dampieria*, since both were apparently described in the same year. Schultz (1967) revised *Labracinus*, correctly crediting (without comment) authorship of the genus to Schlegel (1858). Schultz (1967), in revising *Labracinus*, removed several nominal species to other genera and regarded only four of the 12 remaining nominal species as valid. He restricted the limits of the genus by removing species of Fowler's subgenera *Bartschina* and *Ogilbyina*. Schultz referred *Bartschina* to the synonymy of *Pseudochromis*, but did not comment on the position of *Ogilbyina*.

Gill & Hutchins (1997) described a new genus and species, *Assiculoides desmonotus*, from Australia.

With the exception of some names that have come into common use as a result of my research (e.g., *Assiculus*, *Cypho* and *Ogilbyina*), almost all recent workers have recognised only two pseudochromine genera. Schultz's (1967) definition of *Labracinus* (with *Cichlops* and *Dampieria* as synonyms) has generally been followed, although confusion concerning the priority of the name *Dampieria* has continued. Species not assigned to *Labracinus* have been placed in *Pseudochromis*.

MATERIALS AND METHODS

MERISTIC CHARACTERS: Frequency distributions for meristic characters are given in Appendix 1. Counts of dorsal- anal- and pelvic-fin spines (unsegmented rays) and segmented rays are presented, respectively, as Roman and Arabic numerals. If the last dorsal- or anal-fin ray was divided at its base, it was counted as a single ray. Counts of branched, segmented rays in the dorsal and anal fins include unbranched rays behind the first branched ray. A value was not recorded if, due to tip damage, a branched or unbranched condition could not be determined for the segmented ray preceding the anteriormost branched ray. The upper ray in the pectoral fin of pseudochromines is rudimentary and rotated so that its asymmetrical medial and lateral hemitrichs appear to represent two separate rays; these were counted as a single ray. Procurrent caudal-fin ray counts are of the rays above ("upper") and below ("lower") the principal caudal-fin rays. The uppermost principal caudal-fin ray is the ray articulating with hypural 5, and the lowermost principal caudal-fin ray is the ray articulating with the cartilage nubbin between the distal tips of the parhypural and the haemal spine of preural centrum 2 (= post-haemal spine cartilage of PU2 following the terminology of Fujita, 1989). All pseudochromines normally have 17 (9 + 8) principal caudal-fin rays.

The lateral line of pseudochromines is usually divided into a dorsoanterior ("anterior") and a mid-lateral ("posterior") series. Counts of tubed scales in the lateral lines include both intermittent non-tubed scales and empty scale pockets; if the scale following the last tubed scale in the anterior lateral line was missing, a value for the anterior lateral line count was not recorded. The posterior lateral-line count was divided into a peduncular (ending with the scale at the hypural margin) and a caudal-fin component. If the scale preceding the first tubed scale in the peduncular series or the scale following the last tubed scale in the caudal-fin series was missing, the value for that portion of the posterior scale count was not recorded. Posterior lateral-line counts are given in the descriptions in the form "x + y" where "x" and "y" are the peduncular and caudal-fin components, respectively. Counts of scales between lateral lines were of the number of scales in the posteroventrally slanting transverse scale row between the last tubed scale in the anterior lateral line and the horizontal scale row that included the peduncular lateral line. "Scales in lateral series" is the number of scales in the anterior lateral line plus the number of scales rows on the caudal peduncle, the latter count beginning with the transverse row following the last tubed scale in the anterior lateral line and finishing with the transverse row passing through the last scale of the peduncular lateral-line series. "Termination of the anterior lateral line" was defined as the position of the posteriormost anterior lateral-line scale relative to the bases of the segmented dorsal-fin rays. If the posterior margin of the last anterior lateral-line scale projected past a vertical through the posterior edge of the base of a given ray, it was recorded as having reached the ray immediately posterior to that ray. Counts of horizontal scale rows above the anal-fin origin were made vertically from the anal-fin origin to the base of the dorsal fin, including small scales near the fin bases but excluding scales on the fin rays or membranes. This count is presented in the form "x + 1 + y = z", where "x" is the number of scale rows below the anterior lateral line, "1" represents the anterior-lateral-line scale, and "y" is the number of scale rows above the anterior lateral line; "z" is the total number of horizontal scale rows above the anal-fin origin. Circumpeduncular scales were counted in a zig-zag fashion around the middle of the caudal peduncle. Two counts of cheek scale rows were made, one ("scales behind eye") of the vertical

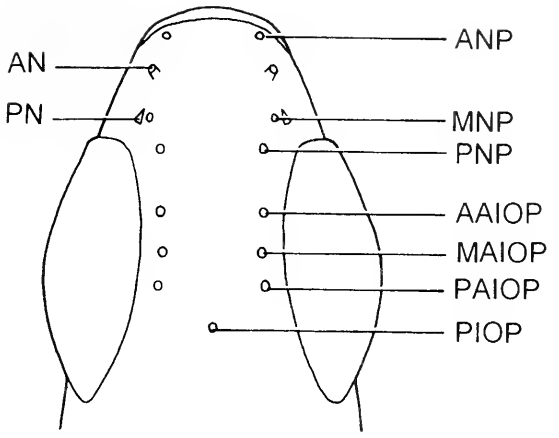

Figure 1. Diagram of the anterior portion of the head of a hypothetical pseudochromine showing the position of typical nasal and interorbital pores (other head pores not shown). Abbreviations: AAIOP, anterior AIO (anterior interorbital) pore; AN, anterior nostril; ANP, anterior nasal pore; MAIOP, mid AIO pore; MNP, middle nasal pore; PAIOP, posterior AIO pore; PIOP, posterior interorbital pore; PN, posterior nostril; PNP, posterior nasal pore.

rows behind the midposterior edge of the orbital rim to the upper edge of the preopercle, the other ("scales to preopercular angle") of the oblique rows from the posteroventral orbital rim to the preopercular angle; both counts included small scales adjacent to the orbital rim and the preopercular edge.

Gill raker counts were of the outer rakers on the first arch and included all rudiments. These are given in the form "x + y = z," where "x" is the number of rakers on the upper limb (epibranchial 1), "y" is the number of rakers on the lower limb (cerato- and hypobranchials 1) and "z" is the total number of rakers; the angle raker articulates with ceratobranchial 1 and was therefore included in the lower (second) count. Pseudobranch filament counts included all rudiments.

Circumorbital pores were counted from the posterior nasal pore (the bilateral pore behind the pore immediately dorso posterior to the posterior nostrils; Figure 1) around the posterior orbital rim to the pore associated with the anterior terminal opening of the first infraorbital bone (the pore immediately below the posterior nostrils). Counts of preopercular pores were of all pores associated with the preopercle, including those associated with the terminal openings. Posterior interorbital (PIO) pores are unpaired, median pores positioned in between and usually slightly posterior to the paired (anterior) interorbital (AIO) pores (Figure 1). References to nasal and interorbital pore positions associated with the anterior extent of predorsal scales follow Figure 1. Other head pore definitions follow Gill & Edwards (1999) and Gill, Mooi & Hutchins (2000). The head pores of *Labracinus* species are small, densely distributed and difficult to count accurately; circumorbital, preopercular, dentary and posterior interorbital pore counts are therefore not included for these species.

MORPHOMETRIC CHARACTERS: All measurements were made with dial calipers to the nearest 0.1 mm. References to specimen length are in mm standard length (SL). Standard length was measured from the anterior tip of the snout to the middle of the caudal fin base at the vertical through the upper hypural plate. The remaining morphometric characters were divided into two sets. The first of these (the triangulation set) was made up of 17 measurements that connected 10 median landmark points around the lateral profile of the head and body. Landmark positions and measurements are clarified in Figure 2. The second set of morphometric characters (non-triangulation set) consisted of measurements of fin rays and head structures. Head length is from snout tip to upper edge of gill opening with the callipers fitting relatively tightly. Snout length is from snout tip to the nearest point on orbital rim without constricting the fleshy margin of the latter. Orbit diameter is the fleshy horizontal diameter. Two interorbital widths were taken. Bony interorbital width is the width of the frontal bones at the narrowest point between the eyes. Fleshy

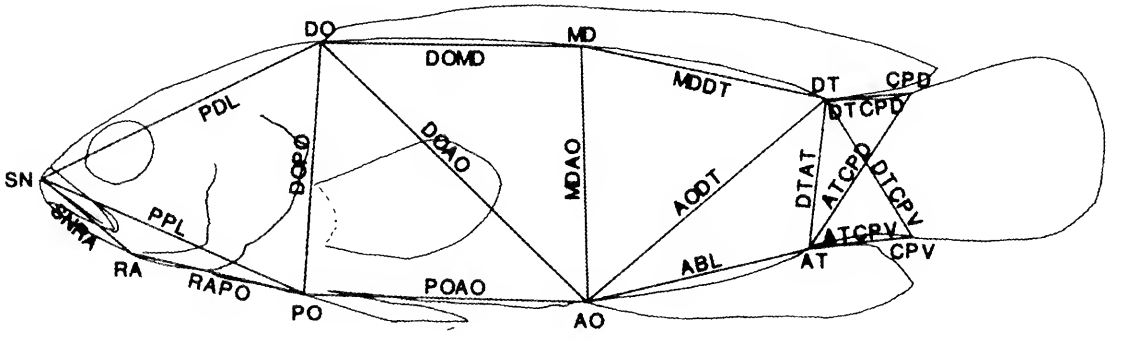

Figure 2. Diagram showing landmarks and measurements used in the triangulation set of morphometric characters. Abbreviations and definitions: ABL, anal-fin base length; AO, anal-fin origin; AODT, anal-fin origin to dorsal-fin termination; AT, anal-fin termination; ATCPD, anal-fin termination to caudal peduncle dorsal edge; ATCPV, anal-fin termination to caudal peduncle ventral edge; CPD, caudal peduncle dorsal edge (dorsal edge of caudal fin at vertical through posterior edge of upper hypural plate); CPV, caudal peduncle ventral edge (ventral edge of caudal fin at vertical through posterior edge of lower hypural plate); DO, dorsal-fin origin; DOAO, dorsal-fin origin to anal-fin origin; DOMD, dorsal-fin origin to middle dorsal-fin ray; DOPO, dorsal-fin origin to pelvic-fin origin; DT, dorsal-fin termination; DTAT, dorsal-fin termination to anal-fin termination; DTCPD, dorsal-fin termination to caudal peduncle dorsal edge; DTCPV, dorsal-fin termination to caudal peduncle ventral edge; MD, middle dorsal-fin ray [for odd number of rays, centre of base of middle dorsal-fin ray or, for even number of rays, centre of interradial gap between middle rays (spines included when enumerating rays)]; MDAO, middle dorsal-fin ray to anal-fin origin; MDDT, middle dorsal-fin ray to dorsal-fin termination; PDL, predorsal length; PO, pelvic-fin origin; POAO, pelvic-fin origin to anal-fin origin; PPL, prepelvic length; RA, posterior tip of retroarticular bone; RAPO, posterior tip of retroarticular bone to pelvic-fin origin; SN, snout tip; SNRA, snout tip to posterior tip of retroarticular bone.

interorbital width is the narrowest point between the eyes without compressing the fleshy interorbital rims. Body width is measured at the (posttemporal) pore patch immediately dorsoanterior to the upper edge of the gill opening. Fin ray measurements were made from the base of the ray to its tip and excluded any filamentous membranes. Caudal-fin length is the length of the lowermost ray on the upper hypural plate. Except in the case of rare species, morphometric values were only taken from relatively undistorted specimens. Measurements were not taken from specimens smaller than 20 mmSL.

MISCELLANEOUS CHARACTERS: Fin spine stoutness was determined subjectively. It was assessed from the basal width of the spine relative to the adjacent segmented ray. "Stout" spines were stouter than the adjacent segmented ray, and "slender" spines ranged from about as stout to much less stout than the adjacent segmented ray. "Pungent" spines were those with a well-defined spiny tip, and "flexible" spines lacked a spiny tip and were often weakly ossified and hair-like distally. The lower lips of pseudochromines may be either interrupted at the symphysis or uninterrupted; these conditions are referred to, respectively, as "incomplete" and "complete" (Figure 3). Specimens with only a slight symphyseal interruption were recorded as "weakly interrupted."

The pattern of interdigitation of supraneural bones and anterior dorsal-fin pterygiophores within interneural spaces is given as an anterior dorsal-fin pterygiophore formula modified from the "predorsal formula" of Ahlstrom et al. (1976). Each supraneural (predorsal) bone is represented by an "S", neural spines are represented by slashes, and pterygiophores are represented by "3" (in the case of pterygiophores that bear two supernumerary rays and a serially associated ray), "2" (one supernumerary ray and one serial ray), or "1" (no supernumerary rays and one serially associated ray). An asterisk is used to identify a pterygiophore or supraneural that was sometimes positioned one interneural space further posteriorly, and a superscript "v" indicates where a supraneural bone was present only as a vestige. Parentheses enclose supraneural bones that were occasionally absent.

An anterior anal-fin pterygiophore formula is also given to illustrate the pattern of interdigitation of anal pterygiophores within interhaemal spaces. It is derived from the above, but differs in that slashes indicate haemal spines.

Epineural counts are of the intermuscular bones that have been traditionally referred to as epipleural ribs by perciform workers; this terminology follows Johnson & Patterson (1993: 557, "the bones conventionally called epipleurals in those fishes [atherinomorphs, perciforms and their relatives] are homologous with the epineurals, not the epipleurals, of non-acanthomorph teleosts").

COLORATION: With few exceptions, pseudochromine species can generally be identified by live coloration alone. Live colourations were variously determined from field notes, photographs of freshly dead or live specimens, published illustrations and direct observations of specimens in the field or in aquaria. The terms "stripe" and "bar" are used throughout the descriptions to refer to markings aligned with the longitudinal and the vertical axes of the body, respectively.

OSTEOLOGY: Osteological features of pseudochromines were determined variously from x-radiographs, specimens cleared with trypsin and stained for bone with alizarin red-S (following the methods of Taylor, 1967), and specimens cleared with trypsin and counterstained for bone with alizarin red-S and for

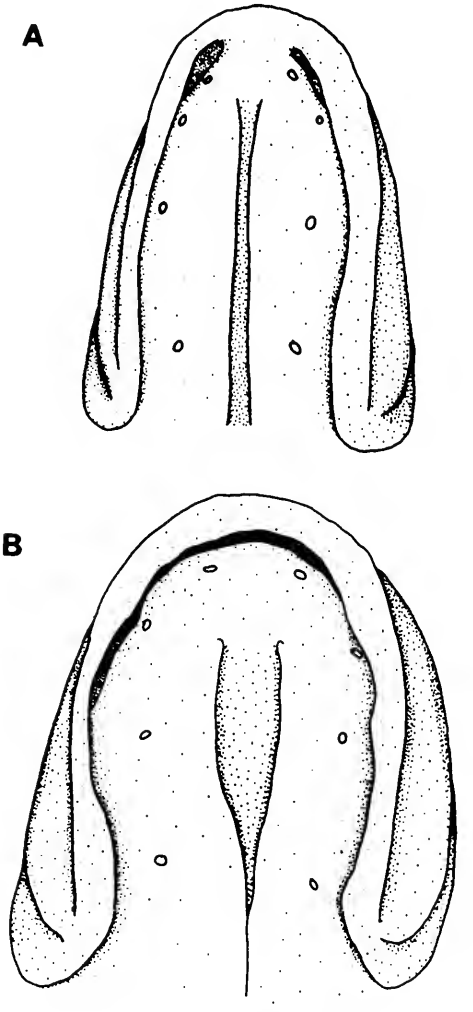

Figure 3. Ventral view of heads of pseudochromines showing A) incomplete, and B) complete lower lips.

cartilage with alcian blue (variously following the methods of Dingerkus & Uhler, 1977, Potthoff, 1984, and Taylor & Van Dyke, 1985).

ABBREVIATIONS: Institutional codes follow Leviton et al. (1985). Abbreviations used in figures are clarified in the accompanying legends.

SYNONYMIES: Synonymy lists for each species were constructed from literature that included either diagnostic descriptions and/or illustrations or referred to museum specimens examined in the study. Literature accounts that did not meet these criteria but were based on other literature that did were also included. The inclusion of these was considered to be justified on the basis that they frequently included new generic combinations for species. The synonymies do not

necessarily include all identifiable references to a given species; in particular, the aquarium fish literature, which is extensive and widely scattered, was not exhaustively searched.

MATERIAL EXAMINED: This revision is based on a detailed study of over 2,500 museum specimens. Over 3,000 lots of fishes were identified in order to provide information for the synonymies and the habitat and distribution accounts. Except in the case of descriptions of new species, materials of each species are listed at the end of each species account. Owing to space restrictions, these lists do not necessarily include all of the material examined (complete catalogues of material examined are available from me); they include at least all material that formed the basis of the descriptions and synonymies. The following format is used in the Material Examined sections, where each item is separated by a comma: locality (listed from most to least general); catalogue number; number of specimens in the lot, followed in parentheses by the number of specimens examined in detail for the species descriptions, and, when not all specimens in the lot were examined in detail, the range of their standard lengths; and, where recorded, the standard length range for all specimens in the lot. For example, "10(8, 28.4-36.9 mm SL), 20.3-44.2 mm SL" means that only eight of the 10 specimens contributed to the description of the species; the smallest and largest specimens in the lot were not examined in detail. Lots are listed under general localities and are separated from each other by a semicolon, except where more than one lot from a specific locality was examined, in which case the locality information is given once and lots from that locality are separated by a comma. Material Examined lists are arranged by locality, generally in north to south and west to east directions.

STATISTICAL ANALYSES: Although not documented herein, geographic and other variation within species and comparisons between species were analysed statistically. Methods and results for these analyses are given in the dissertation version of this revision (Gill, 1990a), and are available on request from me.

GENERIC CLASSIFICATION: Ideally, systematic classifications should only include monophyletic groups (Hennig, 1966). The generic classification used throughout this study is based on the results of a phylogenetic analysis of mainly osteological features. Methods and results of this analysis will be presented elsewhere (Gill, in prep.). The generic and species diagnoses given herein do not necessarily include characters that corroborate monophyly of taxa; they simply include identifying characters that are readily observed. Similarly, the keys and discussions comparing taxa are not intended to imply phylogenetic relationship.

BIOLOGY

Although a detailed discussion of the biology of pseudochromine fishes is beyond the scope of the present study, a brief summary of their biology is presented here as it has some bearing on the systematics of the group. There have been few studies of pseudochromine biology; much of the information presented below has been gleaned from cursory comments in the literature, field notes accompanying museum specimens or original observations. The only detailed study dedicated solely to the biology of a pseudochromine has been Ferrell's (1987) work on the demography and reproductive biology of *Ogilbyina queenslandiae*.

HABITAT AND GENERAL BEHAVIOUR: Pseudochromines are distributed from the east coast of Africa east to American Samoa, north to southern Japan and south to Durban (South Africa) and Elizabeth Reef (northern Tasman Sea). As such, the subfamily is largely restricted to the Indo-West Pacific, with only marginal occurrence on the Pacific Plate (central Pacific), via the Caroline and Melanesian conduits (Springer, 1982). Pseudochromines are associated primarily with small caves and interstices in coral and rock reefs. Several species (e.g., *Pseudochromis fuscus*, *P. linda*, *P. olivaceus* and *P. springeri*) are closely associated with branching corals, and species of the genus *Manonichthys* are facultative inhabitants of large sponges. Members of the subfamily have been collected from shallow intertidal areas down to 100 m.

With the notable exception of *Pseudochromis sankeyi* (which forms large aggregations of up to 100 individuals) and *P. fridmani* (which lives in large groups in closely spaced territories), pseudochromines are usually highly territorial fishes with small home ranges. They occur either singly, in pairs, or in small groups consisting of a male and several females.

Pseudochromines are for the most part generalist micropredators. Hiatt & Strasburg (1960: 84) recorded crustacean fragments (crabs, isopods and copepods) from gut contents of two specimens of *Pseudochromis tapeinosoma* (presumably misidentified *P. cyanotaenia*). Sano et al. (1984) studied gut contents of *Labracinus cyclophthalmus* (as *L. cyclophthalmus*, *L. melanotaenia* and *L. spiloptera*) and *Pseudochromis tapeinosoma* (as *P. melanotaenia* and *P. tapeinosoma*) and noted that both species fed primarily on small fishes and small benthic decapods and polychaetes. My examination of gut contents of various pseudochromine species using radiography and dissection revealed that they eat small crustaceans (including copepods, stomatopods, decapods, amphipods and mysids), polychaetes, molluscs (mainly small bivalves and gastropods) and, to a much lesser extent, small fishes. Although only a few specimens of each species were examined, there were no obvious differences in diet between species, except that larger species were able to take larger prey. This is surprising because morphological and behavioural differences (e.g., sizes and distributions of gill-raker teeth; mimicry in at least some *Manonichthys* species) suggested different feeding behaviours.

HERMAPHRODITISM: Hermaphroditism was first described in pseudochromids by Springer et al. (1977) for the anisochromine, *Anisochromis straussi*. Springer et al. concluded that this species is a protogynous hermaphrodite (i.e., transforms from female to male). They deduced this from the frequeney distribution of sizes of the sexes and from histological studies of sex transforming and transformed individuals.

Ferrell's (1987) study of *Ogilbyina queenslandiae* provided the first detailed information on pseudochromine

reproductive biology. He noted that juveniles of this species usually exhibited male coloration and that sex change was usually from male to female (protandry). However, he also noted infrequent female to male sex changes. Moreover, a small percentage of the population were sex transforming individuals that had a coloration intermediate between the two sexes. These adopted either male or female colourations, depending on local sex ratios.

K. Cole (pers. comm.) has suggested an alternative explanation for Ferrell's observations, that the species does not sex-change per se. Rather, she suggested the species (and possibly other pseudochromids) is a simultaneous hermaphrodite that allocates to one sex or the other. This suggestion raises an issue about the sex of pseudochromine individuals, and about the sexual dichromatism discussed herein for some species (see below). Putative sexual dichromatism was determined from gross examination of gonads; although this probably corresponds to functional sex, further studies are obviously needed.

Based on aquarium observations of live specimens and on studies of museum specimens, it appears that many if not most pseudochromines are probably hermaphroditic. For example, aquarium specimens of *Cypho purpurascens* were observed changing from putative male to female coloration over a period of about two weeks, suggesting that this species is protandrous. Gross examination of gonads of museum specimens, particularly members of the *Pseudochromis tapeinosoma* complex (sensu Gill & Winterbottom, 1993), suggested that some species are probably protogynous; males apparently had ovarian remnants in addition to well-developed testes, and juveniles had female colour patterns.

SEXUAL DICHROMATISM: Sexual dichromatism was first reported for pseudochromines by McCulloch (1926) for *Pseudochromis cyanotaenia* (misidentified as *P. tapeinosoma*). Additional examples of sexual dichromatism have been since reported for various species in the genera *Cypho*, *Labracinus*, *Ogilbyina*, and *Pseudochromis* (e.g., Schultz, 1967; Lubbock, 1977; Thresher, 1984; Ferrell, 1987; Gill, 1990b; Gill & Randall, 1992; Gill & Winterbottom, 1993; Gill & Allen, 1996); further examples are documented herein. Not surprisingly, sexual dichromatism has led to taxonomic confusion. In some cases, female colourations are very similar in all members of a given species complex or genus (e.g., members of the *Pseudochromis tapeinosoma* complex). This has resulted in the females of these species being lumped under a single name, with separate names being applied to each of the relatively distinctive males. Given the probable widespread occurrence of hermaphroditism, intermediate colourations should be expected for the examples reported herein.

SPAWNING AND BROODING BEHAVIOUR: Lubbock (1975) reported spawning behaviour in captive *Pseudochromis flavivertex*. He noted it produces a ball-like mass of eggs, which is guarded by the male within a burrow. Thresher (1984) summarised information on spawning and brooding behaviour in pseudochromids and noted that species produced either a "fluffy" or spherical egg mass that was guarded by the male within a small cave or burrow. He suggested that the presence of spherical egg masses might indicate that pseudochromids and several putative related families (e.g., plesiopids and grammatids) were mouth brooders primitively.

The egg-surface morphology of pseudochromines, anisochromines and pseudoplesiopines has been described and illustrated by Mooi (1990), and of congrogadines by Mooi et al. (1990). Pseudochromine eggs have filaments, which are confined to the half of the egg opposite the micropyle and are attached to the chorion by loaf-like structures. Egg masses are formed by the filaments of adjacent eggs entangling with each other; these filaments account for the "fluffy" property noted by Thresher (1984). Mooi (1990) noted that the loaf-like structures for filament attachment were absent in other pseudochromid subfamilies and other families he examined with egg filaments, and suggested that their presence provided evidence for monophyly of the Pseudochrominae. He further noted that Thresher's (1984) suggestion that the presence of spherical egg masses in pseudochromids and other families indicated that these families were mouth brooders primitively could not be evaluated without further information on the phylogenetic relationships of these families and the distribution of mouth-brooding behaviour. In an analysis of plesiopid relationships, Mooi (1993) noted that mouth brooding was a specialized behaviour within that family, but that spherical egg masses were primitive.

Oral egg masses were discovered in the present study in males of *Assiculus punctatus* and *Pseudochromis fuscus*. However, this may not necessarily indicate oral brooding as the latter species is a demersal spawner (Thresher, 1984: 104). Thresher (pers. comm.) suggested that the presence of an oral egg mass in this species could be explained by protective behaviour by the male; he had seen this species pick up its egg mass in its mouth when threatened. As the *P. fuscus* specimen was taken from the gut of a predatory olive sea snake (*Aipysurus laevis*), this would lend support to Thresher's explanation.

Captive spawning has been reported for a number of pseudochromine species, including *Labracinus cyclophthalmus* (Lange, 1987a, b), *Ogilbyina novaehollandiae* (Wilkerson, 1997), *O. queenslandiae* (this study; see *Remarks* for *O. queenslandiae*), *Pseudochromis aldabraensis* (Wilkerson, 1997), *P. cyanotaenia* (Birkholz, 1985), *P. flavivertex* (Lubbock, 1975; Brons, 1996; Wilkerson, 1997), *P. fridmani* (Brons, 1996; Moe, 1997; Wilkerson, 1997; Wittenrich, 1998), *P. fuscus* (Wilkerson, 1997), *P. olivaceus* (Lubbock, 1975; Wilkerson, 1997) and *P. sankeyi* (Wilkerson, 1997).

Lange (1987a, b) noted that captive *Labracinus cyclophthalmus* lay their eggs in long cords, which attach to each other to form a large fluffy mass; egg masses are transported around the aquarium by the male. Spawning was noted in the present study in a captive pair of *Ogilbyina queenslandiae* (see *Remarks* for *O. queenslandiae*). The eggs were initially in a spherical mass, which was attached to the surface of the male's cave. After several days the mass became amorphous. While it was in the spherical stage, however, the male often moved the egg mass around and attached it to different sites in the cave. Egg masses of *P. flavivertex*, *P. fridmani* and *P. olivaceus* are spherical (Lubbock, 1975; Brons, 1996; Moe, 1997; Wittenrich, 1998). In all reported

pseudochromines the egg mass is guarded by the male.

Breeding in captive pseudochromine pairs has been noted to occur at intervals ranging from every six days (e.g., in *P. fridmani*; Moe, 1997; Wittenrich, 1998) to every three weeks (e.g., in *L. cyclophthalmus*; Lange, 1987a, b), although there is considerable variation within species. Hatching occurs at night and has been reported as occurring from three (e.g., for *L. cyclophthalmus*. Lange, 1987a, b) to seven (e.g., for *O. queenslandiae*; this study) days after being laid. Males do not guard the brood after hatching; larvae immediately leave the nest and become pelagic, swimming towards the surface. Larvae of *P. fridmani* and *P. flavivertex* settle out as juveniles after a period of about 25-30 days from hatching (Brons, 1996; Moe, 1997; Wittenrich, 1998). Larvae of pseudochromids are described by Leis & Rennis (1983) and Gill, Leis & Rennis (2000).

SYSTEMATICS

FAMILY PSEUDOCHROMIDAE

Pseudochromidae Müller & Troschel, 1849: 22.
Cichlopini Bleeker, 1875: 2.
Pseudoplesiopini Bleeker, 1875: 4.
Congrogadina Günther, 1862b: 388.
Haliophidae McCulloch, 1915: 55.
Nesiotidae Herre, 1931b: 13.
Halidesminae Smith, 1952: 87.
Blennodesminae Smith, 1952: 87.
Anisochromidae Smith, 1954: 298.

DIAGNOSIS: The following combination of external characters distinguishes pseudochromids from other perciform fishes: dorsal fin consisting of three (rarely four) or fewer spines and 20-74 segmented rays; lateral line modified (disjunct, posteriorly truncated or multiple); and branchiostegal rays 6. Osteologically they are distinct in having the following character combination: hypurals 1 and 2 fused to each other; hypurals 3 and 4 fused to each other and to urostylar complex; interarcual cartilage between epibranchial 1 and infrapharyngobranchial 2 very small or absent; a single branchiostegal ray (versus two) on posterior ceratohyal (epihyal); and anterior portion of suspensorium only weakly attached to posterior portion. Pseudochromids are also distinctive myologically in having a superficial strap-like A_1 section of the adductor mandibulae that inserts on the medial face of the maxilla and originates on the vertical part of the preopercle. They are also relatively unusual among perciform fishes in having simple attachments of epaxial musculature to the distal regions of anterior dorsal-fin pterygiophores.

REMARKS: A full discussion of the monophyletic status and composition of the Pseudochromidae is beyond the aims of this study, and will be given elsewhere (Gill, in prep.). Most of the above characters are discussed by Springer et al. (1977), Godkin & Winterbottom (1985), Gill & Mooi (1993) and Mooi & Gill (1995); the reader is referred to those papers for details.

SUBFAMILY PSEUDOCHROMINAE

Pseudochromidae Müller & Troschel, 1849: 22.
Cichlopini Bleeker, 1875: 2.
Nesiotidae Herre, 1931b: 13.

DIAGNOSIS: The following two characters are unique (among pseudochromids) to species of the Pseudochrominae: pelvic-fin rays I,5; and all segmented pelvic-fin rays branched (inner ray unbranched in small juveniles of some species). Other characters useful in distinguishing members of the subfamily include: lateral line divided into a dorsoanterior and a midlateral posterior series of tubed scales (midlateral posterior tubed scales sometimes absent in small specimens of some species); usually 3 dorsal-fin spines (2 in *Labracinus* and *Oxycercichthys*, and rarely 4 in some *Pseudochromis* and *Ogilbyina* species); and usually 3 anal-fin spines (2 only in *Pseudochromis kolythrus*), these varying from slender to stout with flexible to pungent tips.

REMARKS: As noted by Springer et al. (1977), Godkin & Winterbottom (1985) and Gill & Hutchins (1997), the Pseudochrominae is currently defined to include all pseudochromids that cannot be placed in the other three subfamilies. The phylogenetic status of the subfamily will be examined elsewhere (Gill, in prep.).

Only two genera, *Labracinus* and *Pseudochromis*, are generally recognised within the Pseudochrominae. However,

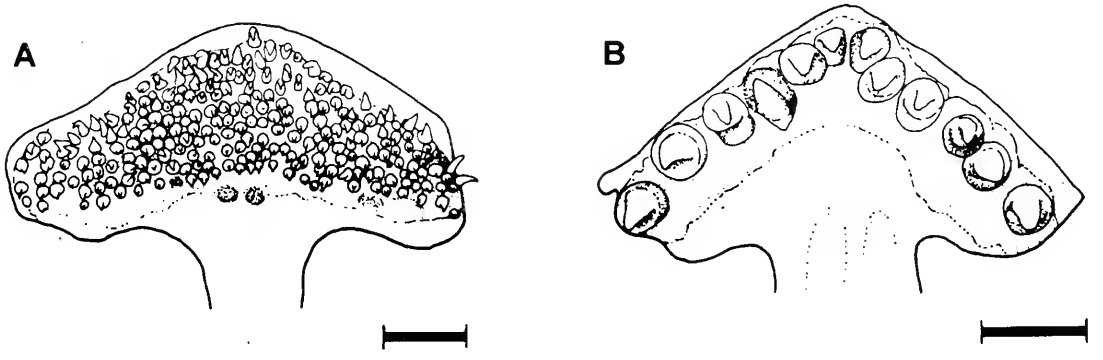

Figure 4. Ventral view of anterior part of vomer of: A) *Ogilbyina queenslandiae*, AMS I.20948-032, 89.7 mm SL, showing triangular patch of small teeth; B) *Pseudochromis fuscus*, AMS I.20575-009, 60.0 mm SL, showing chevron-shaped patch of relatively large teeth. Scale = 0.5 mm.

a total of ten genera are included here: *Assiculoides* Gill & Hutchins, *Assiculus* Richardson, *Labracinus*, *Pseudochromis*, *Cypho* Myers, *Ogilbyina* Fowler (resurrected along with *Assiculus* and *Cypho* from synonymy with *Pseudochromis*) and four new genera. Recognition of these genera is based on the results of a cladistic analysis of primarily osteological characters (Gill, in prep.). Consequently, unique externally visible diagnostic characters are lacking for most genera, and several cannot be diagnosed even by combinations of external characters.

Two of the 103 nominal species described in the Pseudochrominae or in genera currently assigned to this subfamily, *Pseudochromis polyacanthus* Bleeker (1856) and *Pseudochromis rodwayi* Johnston (1902), are referable to other families (Serranidae and Plesiopidae, respectively). *Pseudochromis truncatus* Stinton (1980), which was described from fossil otoliths from England, appears to be referable to the Serranidae, according to W.W Schwarzhans (pers. comm.). The remaining 100 nominal species are referable to 70 valid species. An additional ten new species are described herein. A list of nominal pseudochromine species and their current allocations is presented in Table 1.

Key to the Genera of the Pseudochrominae

1a. Posteriormost dorsal-fin ray bound by membrane to dorsal edge of caudal fin, the membrane interrupting the circumpeduncular scales (i.e., median scale or row of scales along dorsal edge of caudal peduncle absent); anal-fin termination to caudal peduncle ventral edge 5.2-7.9 % SL; total caudal-fin rays 23-25, rarely 25; vertebrae 11-12 + 17-19 = 29-31, usually 12 + 18; infraorbital bones 5; pu2 haemal spine bound to its centrum. ..... *.Assiculoides*
1b. Posteriormost dorsal-fin ray not bound to caudal fin by membrane and circumpeduncular scales not interrupted; anal-fin termination to caudal peduncle ventral edge 7.9-19.5 % SL; total caudal-fin rays 24-34, usually 26 or more; vertebrae 10-11 + 16-18 = 26-29, usually 26-28; infraorbital bones 6; pu2 haemal spine autogenous 2

2a. Segmented dorsal-fin rays 20-22 (usually 22); segmented anal-fin rays 10-13; gill rakers 5-8 + 13-17 = 18-24. .....
..... *.Pictichromis* gen. nov.
2b. Character combination not as above. 3

3a. Segmented dorsal-fin rays 22-24; segmented anal-fin rays 12-14; circumpeduncular scales 17-21; parhypural fused to lower hypural plate; single anterior cartilage head on infrapharyngobranchial 2.. ..... *Assiculus*
3b. Combination of meristic characters not as above; parhypural autogenous; two anterior cartilage heads on second infrapharyngobranchial.. 4

4a. Dorsal-fin rays usually II,25 (rarely II,24 or 26); segmented anal-fin rays usually 14 (rarely 13 or 15); scales in lateral series 52-74; vertebrae usually 11 + 17 (rarely 11 + 16) .....
..... *Labracinus*
4b. Combination of fin-ray and scale counts not as above; vertebrae 10 + 16. 5

5a. Segmented dorsal-fin rays 22-24; segmented anal-fin rays usually 14 (rarely 13); circumpeduncular scales 14-17 (usually 16).. ..... *Cypho*
5b. Character combination not as above. 6

6a. Segmented dorsal-fin rays 22; segmented anal-fin rays 13; scales in lateral series 28-32; dorsal and anal fins with well-developed scaly sheaths..... *.Pholidochromis* gen. nov.
6b. Character combination not as above. 7

7a. Dorsal-fin rays II,25-26 (usually II,26); segmented anal-fin rays 16 ..... *Oxycercichthys* gen. nov.
7b. Character combination not as above. 8

8a. Vomerine teeth small and in a broad triangular patch (Figure 4A); third supraneural bone vestigial or absent; lower lip complete; segmented dorsal-fin rays 31-38; dorsal and anal fins with well-developed scaly sheaths ..... *Ogilbyina*
8b. Vomerine teeth relatively large and in a narrow chevron (Figure 4B); third supraneural bone well developed, about as large as other supraneurals; combination of other characters not as above. 9

9a. Usually at least some ctenoid scales on cheek and/or operculum; if cheek and opercular scales cycloid, then pectoral-fin rays black and ceratobranchial 1 outer gill-rakers with well-developed teeth mainly confined to raker tips; 3-4 (usually 4) dorsal-fin pterygiophores inserting anterior to neural spine 4
..... *Manonichthys* gen. nov.
9b. All scales on cheek and operculum cycloid; if pectoral-fin rays black, then well-developed teeth on outer ceratobranchial-1 gill rakers arranged in two rows running most of length of rakers; 3 dorsal-fin pterygiophores inserting anterior to neural spine 4 ..... *Pseudochromis*

***ASSICULOIDES* Gill & Hutchins**

Assiculoides Gill & Hutchins, 1997: 43 (type species: *Assiculoides desmonotus* Gill & Hutchins by original designation and monotypy).

DIAGNOSIS: The following characters are unique among pseudochromine genera to *Assiculoides*: posteriormost dorsal-fin ray bound posteriorly by membrane to dorsal edge of caudal fin, the membrane interrupting the circumpeduncular scales (i.e., median row of scales along dorsal edge of caudal peduncle absent); anal-fin termination to caudal peduncle ventral edge 5.2-7.9 % SL; total caudal-fin rays 23-25, rarely 25; "anteroventral" scale rows on posterior part of body and caudal peduncle oriented almost vertically; vertebrae 11-12 + 17-19, usually 12 + 18; 18-21 (usually 19-20) consecutive pterygiophores inserting in a 1:1 ratio with interneural spaces immediately behind neural spine 4; infraorbital bones 5; and pu2 haemal spine bound to its centrum.

REMARKS: *Assiculoides* was recently described by Gill & Hutchins (1997) to accommodate a single species from the Kimberley coast of Western Australia. It closely resembles *Assiculus* in general coloration and appearance. Moreover, the two genera also share: low numbers of caudal-fin rays

[total rays 23-24 and 24-27 (usually 26), respectively, versus 26-34 (modally 27-32, depending on species) in other pseudochromines]; high numbers of vertebrae [11-12 + 17-19 (usually 12 + 18) and 11 + 17-18 (usually 11 + 17) versus 10-11 + 16-17]; high numbers of consecutive pterygiophores inserting in a 1:1 ratio with interneural spaces immediately behind neural spine 4 [18-21 (usually 19-20) and 15-17 (usually 16) versus 15 or fewer]; at least some ctenoid scales on the operculum (all cycloid in all other pseudochromines except most species of *Manonichthys*); and parhypural fused to hypurals 1 + 2 (autogenous in other pseudochromines). *Assiculoides* differs from *Assiculus* and all other pseudochromines in the characters indicated in the above diagnosis. Moreover, as noted by Gill & Hutchins (1997), it differs from *Assiculus* in having: more segmented dorsal-fin rays [25-27 (usually 26) versus 22-24 (usually 23)]; more segmented anal-fin rays [14-16 (usually 15) versus 12-14 (usually 13)]; opercle with 3-8 indistinct to distinct serrations, none ventral to subopercle junction (versus with 3-5 conspicuous serrations dorsally, and 1-5 smaller serrations ventral to subopercle junction; see Gill & Hutchins, 1997: fig. 3); posterior margin of lower lip usually with distinct median notch (versus absent or weak; see Gill & Hutchins, 1997: fig. 4); anterior dentary pores closely spaced (versus widely spaced; see Gill & Hutchins, 1997: fig. 4); caudal fin slightly rounded to truncate or slightly emarginate (versus rounded); two epurals (versus three); and a deeper body (dorsal-fin origin to pelvic-fin origin 34.6-38.3 % SL, middle dorsal-fin ray to anal-fin origin 35.2-38.6 % SL versus 29.4-33.7 % SL and 27.8-33.2 % SL, respectively). *Assiculoides* also differs from *Assiculus* in several coloration details: blue spots on body relatively large and confined to anterior part of body (blue spots small and often extending on to posterior part of body in *Assiculus*); prominent blue-edged, black spot on upper part of cheek immediately behind eye (spot absent in *Assiculus*); no dark spot on anterior part of dorsal fin (present in *Assiculus*); bright yellow spots often present on head and/or body (absent in *Assiculus*); and scattered black spots usually present on head and/or body (absent in *Assiculus*). All of these coloration differences are apparent in preserved specimens (blue markings become grey, black markings become dark grey brown to black, and yellow markings become pale brown).

ETYMOLOGY: The generic name is from the Greek *oides*, meaning like, and alludes to the similarity to *Assiculus*. The gender is masculine.

Assiculoides desmonotus Gill & Hutchins

Kimberley Dottyback

Figure 5; Plate 1A

Assiculoides desmonotus Gill & Hutchins, 1997: 45, figs 1A, 2A, 3A, 4A, 5-7 (type locality: Long Id, Vansittart Bay, Western Australia).

DIAGNOSIS: As for genus.

DESCRIPTION (based on 61 specimens, 11.0-54.8 mm SL): dorsal-fin rays III,25-27, last 6-14 segmented rays branched;

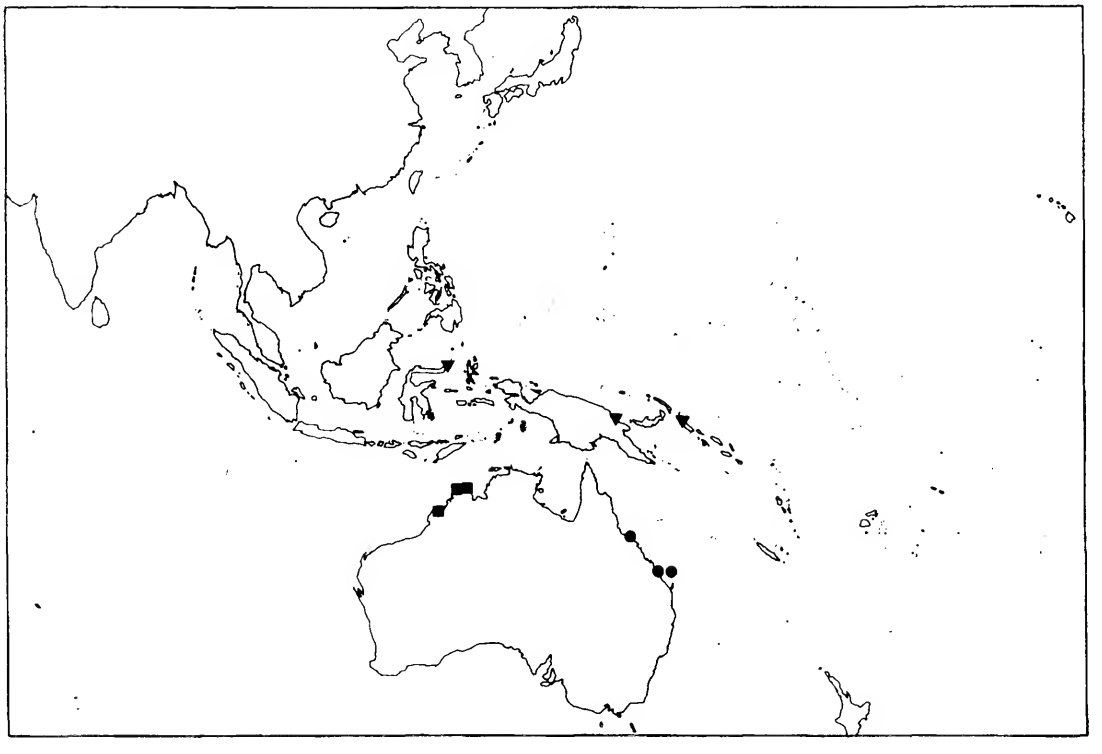

Figure 5. Distributional records for *Assiculoides desmonotus* (squares), *Ogilbyina novaehollandiae* (closed circles) and *Pholidochromis marginata* (triangles).

anal-fin rays III,14-16, last 5-15 segmented rays branched; pectoral-fin rays 14-18; upper procurrent caudal-fin rays 3-4; lower procurrent caudal-fin rays 3-4; total caudal-fin rays 23-25; scales in lateral series 35-42; anterior lateral-line scales 32-39; anterior lateral line terminating beneath segmented dorsal-fin ray 15-21; posterior lateral-line scales 1-10 + 0-2; scales between lateral lines 4-7; horizontal scale rows above anal-fin origin 13-16 + 1 + 2-3 = 16-20; circumpeduncular scales 18-24; predorsal scales 12-17; scales behind eye 1; scales to preopercular angle 3-6; gill rakers 4-7 + 9-13 = 14-18; pseudobranch filaments 7-10; circumorbital pores 19-34; preopercular pores 10-19; dentary pores 3-6; posterior interorbital pores 0.

Lower lip complete, usually with distinct median notch; dorsal and anal fins without distinct scaly sheaths, although sometimes with a few scales overlapping fin bases; predorsal scales extending to between posterior and anterior AIO pores; opercle with 3-8 indistinct to distinct serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or with well-developed teeth confined to distal halves or tips of rakers; anterior dorsal-fin pterygiophore formula S*/S*/3 + 1*/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1; dorsal-fin spines pungent and relatively slender; anterior anal-fin pterygiophore formula 3 + 1*/1/1/1/1/1/1, 3 + 1/1 + 1/1/1/1/1/1 or 3 + 1/1/1 + 1/1/1/1/1; anal-fin spines pungent and relatively slender, third spine usually slightly stouter than second; pelvic-fin spine pungent and relatively slender; second segmented pelvic-fin ray longest; caudal fin varying from slightly rounded to truncate or slightly emarginate; vertebrae 11-12 + 17-19 = 29-31; epineurals 13-16; epurals 2.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-2 (on sides of jaw) irregular inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than those of inner rows; lower jaw with 1-3 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical to caniniform teeth, anteriormost tooth of single row on sides of jaw enlarged and caniniform, those behind becoming smaller and conical; vomer with 2 rows of small conical teeth arranged in chevron; palatine with 1-3 irregular rows of small conical teeth arranged in ovoid patch, anterior part of tooth patch more-or-less contiguous anteriorly with posterolateral arm of vomerine patch; ectopterygoid edentate; tongue weakly pointed to rounded and edentate.

As percentage of SL (based on 20 specimens, 24.5-54.8 mm SL): head length 25.6-30.6; orbit diameter 8.9-13.1; snout length 6.4-7.6; fleshy interorbital width 5.4-6.7; bony interorbital width 3.6-4.8; body width 15.1-16.7; snout tip to posterior tip of retroarticular bone 13.6-15.5; predorsal length 31.1-35.5; prepelvic length 34.2-37.0; posterior tip of retroarticular bone to pelvic-fin origin 19.7-25.3; dorsal-fin origin to pelvic-fin origin 34.6-38.3; dorsal-fin origin to middle dorsal-fin ray 38.4-43.9; dorsal-fin origin to anal-fin origin 47.5-51.8; pelvic-fin origin to anal-fin origin 22.0-27.7; middle dorsal-fin ray to dorsal-fin termination 28.9-34.1; middle dorsal-fin ray to anal-fin origin 35.2-38.6; anal-fin origin to dorsal-fin termination 44.4-49.6; anal-fin base length 33.0-39.3; dorsal-fin termination to anal-fin termination 18.7-20.2; dorsal-fin termination to caudal peduncle dorsal edge 2.3-3.9; dorsal-fin termination to caudal peduncle ventral edge 18.5-20.1; anal-fin termination to caudal peduncle dorsal edge 19.1-20.8; anal-fin termination to caudal peduncle ventral edge 5.2-7.9; first dorsal-fin spine 3.6-8.1; second dorsal-fin spine 8.5-10.9; third dorsal-fin spine 11.4-14.0; first segmented dorsal-fin ray 15.7-21.7; fourth last segmented dorsal-fin ray 22.1-32.3; first anal-fin spine 4.2-6.3; second anal-fin spine 7.9-9.7; third anal-fin spine 11.4-13.7; first segmented anal-fin ray 16.3-19.5; fourth last segmented anal-fin ray 21.5-29.3; third pectoral-fin ray 14.9-21.8; pelvic-fin spine 11.8-13.8; second segmented pelvic-fin ray 27.0-38.4; caudal-fin length 29.3-33.3.

Live coloration (based on colour photographs of specimens when freshly dead; Plate 1A): head and body purplish brown to golden brown, dark bluish grey or dark grey (almost black); pale blue to bright blue or turquoise punctate spots on lips, snout and dorsal part of head, spots becoming larger and tending to coalesce to form irregular markings on remainder of head; large (greater than one-half eye diameter), obliquely elongate, black spot on upper part of cheek immediately behind eye, edged in bright blue to turquoise; iris grey to pale yellow or orange, usually with two bright blue oblique stripes, one above and one below pupil; pupil edged narrowly with bright red; scales on body in front of anal fin each with a large bright blue spot basally, these less distinct ventrally and posteriorly; large bright yellow spots usually present on bases of some scales of anterior half of body; head and body often with scattered black spots and irregular markings; dorsal fin greyish brown to golden brown or black, with narrow bright blue distal margin and three (anteriorly) to about 10 (posteriorly) narrow, bright blue oblique stripes; distal margin of posterior part of dorsal fin sometimes bright red; anal fin greyish brown to golden brown or black, sometimes with small gold spot at base of fin rays; anterior part of anal fin with four or five narrow, bright blue oblique stripes, these becoming indistinct posteriorly; distal margin of anal fin bright blue; caudal fin golden brown to greyish brown or black, usually with small bright blue spots and bright blue distal margin; caudal fin sometimes with broad bright red posterior margin; pelvic fins golden brown to grey or dark grey (almost black), often narrowly blue along anterior margins; pectoral-fin base dark grey to black, remainder of fin greyish hyaline.

Preserved coloration: pattern similar to freshly dead coloration, except ground coloration of head, body and dorsal, anal, caudal and pelvic fins varies from brown to dark grey (almost black in some specimens); blue markings on head, body and fins becoming grey; black markings becoming dark grey-brown to black; gold, golden brown and red markings becoming pale brown.

HABITAT AND DISTRIBUTION: *Assiculoides desmonotus* is known only from the coastal region of the Kimberley district of Western Australia, from the vicinity of Cape Londonderry south to the vicinity of Sunday Id (Figure 5). It has been collected from around rocks, coral and soft coral in tidal pools in 0-1.5 m.

COMPARISONS: Comparisons with other pseudochromines are given in *Remarks* under the generic account.

REMARKS: *Assiculoides desmonotus* is a moderate-sized

species; the largest specimen examined measured 54.8 mm SL. Colour illustrations of the species are given in Gill & Hutchins (1997).

ETYMOLOGY: The specific epithet, from the Greek *desmos*, bond, and *notos*, back, alludes to the membranous connection between the posterior part of the dorsal fin and the dorsal part of the caudal fin. The gender is masculine.

MATERIAL EXAMINED: WESTERN AUSTRALIA: bay southest of Cape Londonderry (13°45'S 126°58'E), WAM P.31097-021, 2(2), 43.6-50.9 mm SL (paratypes); Jones Id (13°45'S 126°22'E), WAM P.31078-006, 6(6), 22.1-51.0 mm SL (paratypes); Vansittart Bay, Long Id (13°59'S 126°20'E), AMS I.37743-001, 1(1), 52.4 mm SL (paratype), BMNH 1996.10.29.8-11, 4(4), 45.2-54.8 mm SL (paratypes), BPBM 37392, 1(1), 49.6 mm SL (paratype), CSIRO H.4427-01, 1(1), 50.4 mm SL (paratype), NTM S.14381-001, 1(1), 52.9 mm SL (paratype), QM I.30763, 1(1), 50.2 mm SL (paratype), ROM 70516, 1(1), 46.7 mm SL (paratype), RUSI 70516, 1(1), 37.3 mm SL (paratype), WAM P.31084-003, 2(2), 26.1-41.1 mm SL (paratypes), WAM P.31085-009, 1(1), 46.6 mm SL (holotype), WAM P.31085-037, 5(5), 34.1-50.9 mm SL (paratypes), WAM P.31085-029, 22(0), 16.0-50.5 mm SL; Admiral Id (16°04'S 123°24'E), WAM P.30916-008, 1(1), 45.1 mm SL (paratype); Bedford Id (16°09'S 123°20'E), WAM P.30910-009, 6(6), 34.4-57.2 mm SL (paratypes); Whirlpool Pass (16°16'S 123°30'E), WAM P.30929-008, 10(10), 11.0-47.8 mm SL (2 specimens, 41.3-46.2 mm SL, subsequently cleared and stained) (paratypes); Mermaid Id (16°26'S 123°21'E), WAM P.30908-003, 1(1), 35.8 mm SL (paratype); Sunday Id (16°25'S 123°11'E), WAM P.30321-021, 9(9), 24.5-49.0 mm SL (paratypes), WAM P.30898-008, 7(7), 33.6-46.7 mm SL (paratypes).

ASSICULUS Richardson

Assiculus Richardson, 1846: 492 (type species: *Assiculus punctatus* Richardson by monotypy).

DIAGNOSIS: *Assiculus* is distinguished from all other pseudochromid genera by the following combination of external characters: dorsal-fin rays III,22-24 (usually 23); anal-fin rays III,12-14 (usually 13); upper and lower procurrent caudal-fin rays 4-5 (usually 5) and 3-5 (usually 4), respectively, total caudal-fin rays 25-27 (usually 26); circumpeduncular scales 17-21; dorsal and anal fins without distinct scale sheaths; and lower lip complete. The unusual opercle shape with serrations ventral to the subopercle junction in combination with the presence of ctenoid cheek and/or opercular scales (Figure 6) is unique among pseudochromines.

REMARKS: Although most authors have treated *Assiculus* as a junior synonym of *Pseudochromis*, it is distinct in having relatively high vertebral counts (11 + 17-18 [usually 17] versus 10 + 16 for *Pseudochromis*). Similar high vertebral counts are otherwise found among pseudochromines only in *Assiculoides* and *Labracinus*. Comparisons with *Assiculoides* are discussed under *Remarks* for that genus. *Labracinus* is readily distinguished from *Assiculus* in having only two dorsal-fin spines (versus three), three equal-sized supraneural bones (versus either two, or three with the third a rudiment), and

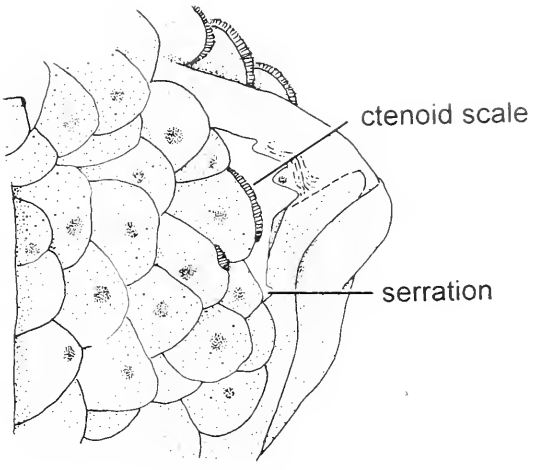

Figure 6. Upper part of the operculum of *Assiculus punctatus*, AMS I.13113, 49.9 mm SL, showing a single opercular spine ventral to the subopercle junction and two ctenoid opercular scales.

smaller scales (e.g., scales in lateral series 52-74 and circumpeduncular scales 24-32 versus 38-48 and 17-21, respectively, for *Assiculus*).

The combination of relatively low segmented dorsal- and anal-fin ray counts, low number of procurrent caudal-fin rays, a circumpeduncular scale count of 17-21 (usually 20), lack of distinct scale sheaths on either the dorsal or anal fins, and presence of a complete lower lip further distinguishes *Assiculus* from *Pseudochromis* and all other pseudochromine genera except *Assiculoides*. It is also distinctive osteologically in having the parhypural fused to the lower hypural plate, a character that is otherwise known among pseudochromines only in *Assiculoides*. Other characters useful in diagnosing the genus include the presence of ctenoid scales on the operculum (otherwise known only from *Assiculoides* and most species of *Manonichthys*) and of opercular serrations ventral to the subopercle junction [otherwise found only in certain *Pseudochromis* species (*P. howsoni*, *P. moorei*, *P. quinquedentatus* and *P. steenei*)].

Assiculus is monotypic and restricted to northwestern Australia.

ETYMOLOGY: The generic name is from the Latin *assis*, a board or plank, and refers to the thin body of the holotype of the type species. This condition is not typical for the species and probably represents a preservation artifact. The gender is masculine.

Assiculus punctatus Richardson
Blue-spotted Dottyback
Figures 6-7; Plates 1B-C; Table 2

Assiculus punctatus Richardson, 1846: 494, pl. 2, figs. 1-5 [type locality: Coast of Australia (= northwest Australia, see McCulloch, 1929)]; Larson, 1988: 161 (list; Darwin Harbour); Gill, 1993: 34 (sexual dimorphism; habitat and distribution); Gill & Randall, 1994: 17 (comparison); Gill & Hutchins, 1997: 44, figs 1B, 2B, 3B, 4B, 8-9 (comparison); Allen, 1997: 94, pl. 28-13 (description; distribution; col. fig.); Gill, 1999b: 2568

(description; distribution; fig.).

Pseudochromis Mülleri Klunzinger, 1880: 370 (type locality: Port Darwin); Macleay, 1884: 28 (compilation).

Cichlops filamentosus Macleay, 1881: 570 (type locality: Port Darwin).

Pseudochromis muelleri; Waite, 1905: 62 (synonymy with *C. filamentosus* Macleay).

Pseudochromis fuscus [*non* Müller & Troschel, 1849]; Montague, 1914: 650 (Monte Bello Ids, Australia).

Pseudochromis punctatus; McCulloch, 1915: 47 (Shark Bay, Western Australia; synonymy with *Pseudochromis muelleri* Klunzinger and *Cichlops filamentosus* Macleay); Paradice & Whitley, 1927: 85 (Pelew Id and Darwin, Northern Territory, Australia); McCulloch, 1929: 157 (list; distribution); Taylor, 1964: 165 (Groote Eylandt, Northern Territory); Allen, 1985: 2508 (list, Western Australia); Allen & Swainston, 1988: 60, pl. 21, fig. 336; Paxton et al., 1989: 520 (list; distribution); Black et al., 1990: 256 (list; Shark Bay, Western Australia); Hutchins, 1990: 269 (list; Shark Bay, Western Australia).

Pseudochromis (Pseudochromis) punctatus; McCulloch, 1926: 186 (key).

Pseudochromis (Assiculus) punctatus; Fowler, 1931b: 25 (compilation); Whitley, 1948: 18 (list; Western Australia); Scott, 1959: 74 (key); Whitley, 1964a: 42 (list).

DIAGNOSIS: As for genus.

DESCRIPTION (based on 63 specimens, 21.7-69.7 mm SL): dorsal-fin rays III,22-24, last 5-9 segmented rays branched; anal-fin rays III,12-14, last 3-14 segmented rays branched; pectoral-fin rays 15-18; upper procurrent caudal-fin rays 4-5; lower procurrent caudal-fin rays 4-5; total caudal-fin rays 25-27; scales in lateral series 38-48; anterior lateral-line scales 33-46; anterior lateral line terminating beneath segmented dorsal-fin ray 16-21; posterior lateral-line scales 5-11 + 0-2; scales between lateral lines 3-5; horizontal scale rows above anal-fin origin 12-16 + 1 + 1-4 = 15-20; circumpeduncular scales 17-21; predorsal scales 12-18; scales behind eye 1-4; scales to preopercular angle 4-6; gill rakers 3-7 + 9-11 = 12-17; pseudobranch filaments 8-12; circumorbital pores 22-44; preopercular pores 9-18; dentary pores 4; posterior interorbital pores 0-2.

Lower lip complete; scales usually absent from dorsal and anal fins, although intermittent scales sometimes overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of posterior AIO pores to midway between anterior AIO and anterior frontal pores; opercle with 3-5 large distinct serrations, with additional 1-5 serrations below subopercle junction; teeth of outer ceratobranchial-1 gill rakers usually either weakly developed or with well-developed teeth confined to raker tips, although well-developed teeth may run most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/(S^v) + 3/1 + 1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1 + 1*/1* + 1*; dorsal-fin spines pungent and relatively slender; anterior anal-fin pterygiophore formula 3/1 + 1/1/1/1/1/1/1/1 + 1*/1* + 1*/1* + 1*; anal-fin spines pungent and relatively slender, third spine usually slightly stouter than second; pelvic-fin spine pungent and moderately slender; second segmented pelvic-fin ray usually longest, rarely third longer; caudal fin rounded; vertebrae 11 + 17-18; epineurals 13-16; epurals 3.

Upper jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-2 (on sides of jaw)

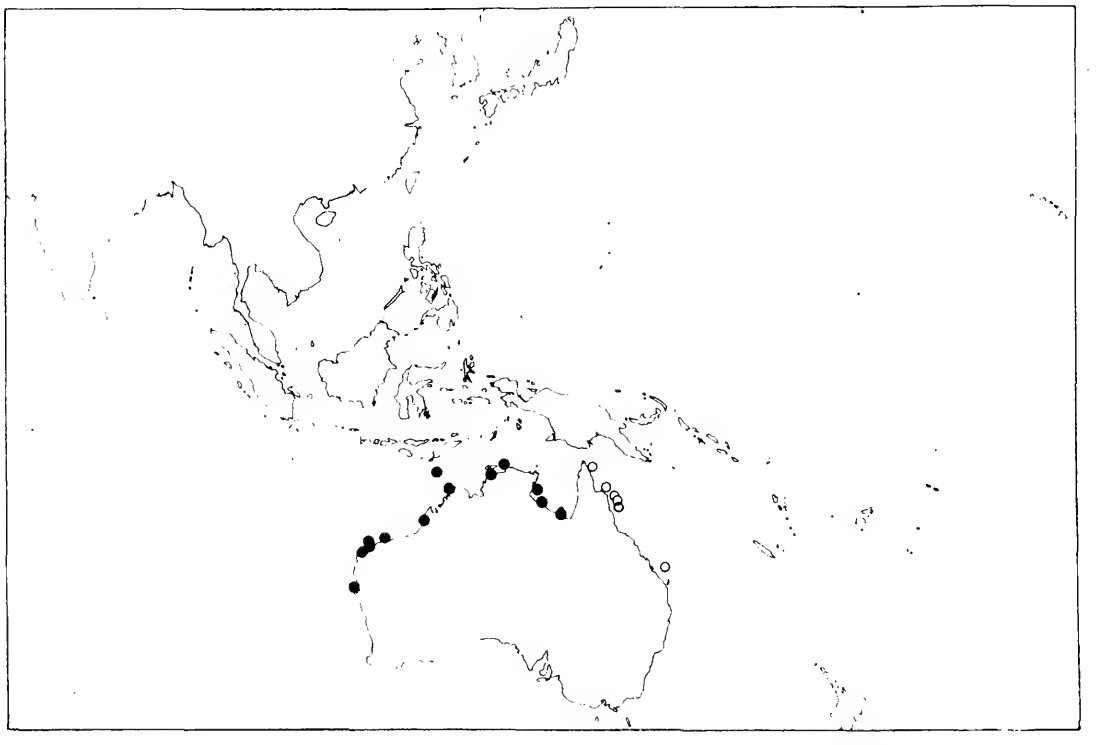

Figure 7. Distributional records for *Assiculus punctatus* (closed circles) and *Oxycercichthys veliferus* (open circles).

irregular rows of small conical teeth, teeth of outermost of rows of conical teeth much larger and more curved than those of inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical to caniniform teeth, those on middle part of jaw large and caniniform; vomer with 1-3 rows of small conical teeth arranged in chevron; palatine with 1-4 irregular rows of small conical teeth arranged in ovoid patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine patch; ectopterygoid edentate; tongue weakly pointed to rounded and edentate.

As percentage of SL (based on 19 specimens, 32.1-69.7 mm SL): head length 22.3-27.0; orbit diameter 7.0-10.3; snout length 5.1-6.5; fleshy interorbital width 4.3-6.5; bony interorbital width 2.8-4.6; body width 12.8-15.0; snout tip to posterior tip of retroarticular bone 13.6-17.9; predorsal length 27.5-33.6; prepelvic length 29.3-35.7; posterior tip of retroarticular bone to pelvic-fin origin 16.4-22.6; dorsal-fin origin to pelvic-fin origin 29.4-33.7; dorsal-fin origin to middle dorsal-fin ray 32.7-37.6; dorsal-fin origin to anal-fin origin 38.9-46.4; pelvic-fin origin to anal-fin origin 23.3-31.1; middle dorsal-fin ray to dorsal-fin termination 28.2-34.6; middle dorsal-fin ray to anal-fin origin 27.8-33.2; anal-fin origin to dorsal-fin termination 38.1-44.2; anal-fin base length 31.2-37.1; dorsal-fin termination to anal-fin termination 15.5-19.4; dorsal-fin termination to caudal peduncle dorsal edge 6.6-8.7; dorsal-fin termination to caudal peduncle ventral edge 16.6-20.1; anal-fin termination to caudal peduncle dorsal edge 17.8-21.6; anal-fin termination to caudal peduncle ventral edge 8.1-9.9; first dorsal-fin spine 2.6-6.1; second dorsal-fin spine 7.3-10.4; third dorsal-fin spine 10.2-14.7; first segmented dorsal-fin ray 15.5-25.1; fourth last segmented dorsal-fin ray 21.9-49.6; first anal-fin spine 3.5-5.4; second anal-fin spine 6.2-10.0; third anal-fin spine 7.7-14.0; first segmented anal-fin ray 14.2-19.9; fourth last segmented anal-fin ray 23.1-50.3; third pectoral-fin ray 14.8-18.6; pelvic-fin spine 8.1-14.3; second segmented pelvic-fin ray 23.7-49.7; caudal-fin length 25.3-38.2.

Live coloration (based on photographs of specimens from Shark Bay, Exmouth Gulf and Darwin, Australia and on field observations of specimens in Exmouth Gulf; Plates 1B-C): head and body brown to olive or dark grey to black, sometimes becoming reddish brown to bright yellow ventrally on head and breast, each scale with indistinct to distinct small bright blue spot; series of small bright blue spots around posteroventral margin of orbit; iris brownish grey to dark grey, sometimes with submarginal circle of bright blue spots, narrowly bright orange to bright red around rim of pupil; posterior part of body sometimes with several brown to olive oblique bars extending posteroventrally from dorsal-fin base; dorsal fin either entirely dark grey to black, or reddish brown basally, dark grey to olive distally, remainder of fin broadly olive or brown to bright yellow-brown; distal part of first few interradial membranes reddish brown to bright red, bordered proximally by large horizontally elongate dark grey to black spot; several wavy bright blue stripes dorsoanteriorly on fin with either several horizontal rows of small bright blue spots or scattered bright blue spots and lines on remainder of fin; distal margin of dorsal fin narrowly bright blue; anal fin similar to dorsal fin except without reddish brown to bright red distal area or dark grey to black spot; caudal fin brownish hyaline, brown, bright yellow-brown or dark grey to black, usually with scattered small bright blue spots, sometimes with bright blue dorsal and ventral margin; pectoral fins yellowish hyaline to hyaline; pelvic fins entirely grey to black, or broadly dark grey anteriorly, this edged anteriorly with pale grey to bright blue, posterior part of fin greyish or brownish hyaline to bright yellow-brown, sometimes with scattered blue spots; fin rays sometimes edged with bright blue; posterior few interradial membranes sometimes with several rows of reddish brown to bright orange spots.

Preserved coloration: head and body pale brown to dark brown, paler on breast and ventral part of head; operculum, cheek and pectoral base with oblique rows of dark greyish brown to tan spots; body scales often edged with dark brown, forming reticulated pattern; unpaired fins greyish hyaline to dark brown or dark grey; dorsal and anal fins sometimes with pale wavy lines anteriorly and pale spots posteriorly; dorsal fin with dark grey to black spot anteriorly; pectoral fins hyaline; pelvic fins pale brown to dark grey.

HABITAT AND DISTRIBUTION: *Assiculus punctatus* is presently known only from northwestern Australia, from Shark Bay (Western Australia) to the vicinity of the Wellesley Ids in the Gulf of Carpentaria, Queensland (Figure 7). It has been collected from reef and weed-bed areas at depths ranging to 31 m, often in relatively murky waters. In the Darwin area the species is usually associated with highly eroded limestone reefs and specimens may be collected intertidally by shaking fish from crevices in small rocks (H.K. Larson, pers. comm.). The specimen from the Monte Bello Ids that formed the basis of Montague's (1914) record of *Pseudochromis fuscus* from those islands (BMNH 1913.12.6.11) was taken from a hole in a dredged rock.

COMPARISONS: *Assiculus punctatus* is a distinctive species that is unlikely to be confused with any other pseudochromids. In addition to the characters discussed in the *Remarks* section of the generic account, the live and preserved colourations are diagnostic for the taxon.

REMARKS: *Assiculus punctatus* is a moderate-sized pseudochromine; the largest specimen examined measured 63.0 mm SL. Colour figures of this species are given in Allen & Swainston (1988) and Gill & Hutchins (1997).

Oral egg masses were found in two male specimens: a 38.9 mm SL specimen from Shark Bay (AMS I.13113) and a 31.6 mm SL specimen from the Gulf of Carpentaria (AMS I.15557-296). However, as oral egg masses are known from a non-mouthbrooding pseudochromine, *Pseudochromis fuscus*, it is clear that the presence of oral egg masses is not in itself sufficient evidence of mouthbrooding in *A. punctatus*.

Assiculus punctatus shows considerable variation in ground coloration of the head, body and fins, ranging from yellowish or pale brown to black. However, live specimens observed by me in Exmouth Gulf appeared to show at least some ability to alter their ground coloration, as well as the presence or absence of barring on the body.

Assiculus punctatus exhibits noteworthy geographic variation in several meristic characters (Table 2), and it is possible that further studies may warrant the subdivision of

Table 2. Frequency distributions for selected meristic characters of *Assiculus punctatus* from different localities.

	Pectoral-fin rays					Anterior lateral-line scales														
	15	16	17	18	$\bar{x}$	33	34	35	36	37	38	39	40	41	42	43	44	45	46	$\bar{x}$
Gulf of Carpentaria	-	-	-	4	18.0	-	-	-	-	-	1	-	-	1	1	-	-	-	-	40.3
Coburg Peninsula	-	-	1	3	17.8	-	-	-	1	-	1	1	1	-	-	-	-	-	-	38.3
Darwin	-	-	4	20	17.8	-	-	3	7	4	5	3	1	-	-	-	-	-	-	37.0
Cassini Id	-	-	-	2	18.0	-	2	-	-	-	-	-	-	-	-	-	-	-	-	34.0
Ashmore Reef	-	-	-	4	18.0	1	-	-	1	1	-	-	-	-	-	-	-	-	-	35.3
Roebuck Bay	-	-	5	9	17.6	-	-	-	4	-	2	3	3	2	-	-	-	-	-	38.5
Dampier Arch.	-	-	-	2	18.0	-	-	-	-	-	-	-	-	-	-	1	-	-	1	44.5
Monte Bello Ids	-	-	4	-	17.0	-	-	-	-	-	-	1	1	-	1	1	-	-	-	41.0
Onslow	-	-	1	1	17.5	-	-	-	-	-	-	-	1	-	-	1	-	-	-	41.5
Exmouth Gulf	-	-	11	7	17.4	-	-	-	-	-	2	2	5	4	3	1	1	-	-	40.6
Shark Bay	1	2	19	26	17.5	-	-	2	1	4	10	16	8	4	2	1	-	-	-	38.9

	Scales in lateral series												Upper gill rakers					
	38	39	40	41	42	43	44	45	46	47	48	$\bar{x}$	3	4	5	6	7	$\bar{x}$
Gulf of Carpentaria	-	-	-	-	1	1	1	1	-	-	-	43.5	-	1	1	-	-	4.5
Coburg Peninsula	-	-	-	1	1	2	-	-	-	-	-	42.3	-	-	2	-	-	5.0
Darwin	1	-	5	5	8	5	-	-	-	-	-	41.4	-	2	3	6	1	5.5
Cassini Id	-	2	-	-	-	-	-	-	-	-	-	39.0	-	1	-	-	-	
Ashmore Reef	1	1	1	-	1	-	-	-	-	-	-	39.8	-	1	1	-	-	4.5
Roebuck Bay	-	-	-	3	4	4	3	-	-	-	-	42.5	1	5	1	-	-	4.0
Dampier Arch.	-	-	-	-	-	-	-	1	-	-	1	46.5	-	-	1	-	-	
Monte Bello Ids	-	-	-	-	-	1	1	2	-	-	-	44.3	-	1	-	1	-	5.0
Onslow	-	-	-	-	-	1	-	1	-	-	-	44.0	-	-	1	-	-	
Exmouth Gulf	-	-	-	1	1	5	2	6	2	1	-	44.2	-	2	6	1	-	4.9
Shark Bay	1	1	2	4	7	11	11	8	3	-	-	43.1	-	6	14	4	-	4.9

the species as currently diagnosed into two or more species.

Efforts to locate the holotype of *Assiculus punctatus* Richardson (1846) were unsuccessful. However, Richardson's description is diagnostic for the present species. Klunzinger's (1880) holotype of *Pseudochromis muelleri* also appears to be lost. It seems that the specimen was deposited in the Staatliches Museum für Naturkunde in Stuttgart (SMNS), as a registration number exists for it (SMNS 2759). However, it is missing from a post-World War II catalogue of SMNS fish holdings, and could not be located during a visit to the institution in 1987. Fricke (1992: 16) was also not able to locate the specimen. It seems reasonable to assume that the specimen has been lost, and may have been destroyed during World War II. Aside from a few minor discrepancies in fin-ray counts, Klunzinger's description is clearly based on the present species.

The syntypic series of *Cichlops filamentosus* Macleay (1881) is composite, consisting of eight specimens of *A. punctatus* and two specimens of *Pseudochromis wilsoni*; a lectotype is therefore designated here (AMS I.18388-001). It is clear that the *P. wilsoni* specimens did not contribute to Macleay's description. In the interest of nomenclatural stability, I here designate the lectotype of *C. filamentosus* (AMS I.18388-001) the neotype of *A. punctatus* Richardson and *P. muelleri* Klunzinger.

ETYMOLOGY: The specific name is from the Latin *punctum*, small hole or dot, alluding to the pattern of small blue spots on the vertical fins, head and anterior part of the body.

MATERIAL EXAMINED: WESTERN AUSTRALIA: Shark Bay, WAM P.4899, 2(2), 35.2-48.0 mm SL, WAM P.5314, 1(1), 48.9 mm SL; Shark Bay, Useless Inlet, AMS I.13113, 6(6), 38.9-63.0 mm SL (63.0 mm SL specimen cleared and stained); Shark Bay, Denham, WAM P.7635-37, 4(4), 43.3-55.7 mm SL; Shark Bay, 25°56'S 11°10'E, WAM P.30078-004, 1(1), 54.4 mm SL; Shark Bay, 25°56'S 113°32'E, WAM P.30165-005, 4(3, 45.2-61.5), 9.5-61.5 mm SL; Shark Bay 26°09'S 113°13'E, WAM P.30083-003, 2(2), 29.5-61.7 mm SL; Shark Bay, 25°48'S 113°43'E, WAM P.30171-006, 5(5), 39.5-69.7 mm SL; Shark Bay, 25°56'S 113°32'E, WAM P.30164-004, 1(1), 38.1 mm SL; Exmouth Gulf, WAM P.7215-16, 2(2), 37.0-43.6 mm SL; Exmouth Gulf, NW of Burnside Id, WAM P.31013-012, 7(7): 33.7-52.0 mm SL; Onslow, WAM P.9258, 1(1), 37.4 mm SL; Monte Bello Ids, 20°24'24"S 115°33'36"E, WAM P.30678-002, 1(1), 47.2 mm SL; Monte Bello Ids, off Hermite Id, BMNH 1913.12.6.11, 1(1), 38.4 mm SL; Dampier Archipelago, Hampton Harbour, AMS IB.3068, 1(1), 45.2 mm SL; Roebuck Bay, BMNH 1933.8.14.4-10, 7(0); Broome, AMS IA.4720, 1(0), 21.0 mm SL; AMS IA.5118, 1(0), 23.0 mm SL, AMS I.27749-010, 1(0), 36.0 mm SL; E side of Cassini Id, WAM P.30848-001, 1(1), 35.3 mm SL. NORTHERN TERRITORY, AUSTRALIA: Ashmore Reef, NTM S.12333-002, 2(2), 28.1-28.6 mm SL; Darwin (Port Darwin), AMS I.18388-001, 1(1), 57.3 mm SL (lectotype of *C. filamentosus* Macleay; neotype of *A.*

punctatus Richardson and *P. muelleri* Klunzinger), AMS I.16326-001, 7(7), 40.8-59.4 mm SL [paralectotypes (in part) of *C. filamentosus* Macleay], QM I.3988, 1(1), 46.2 mm SL, QM 7420, 1(1), 47.4 mm SL; Darwin, off Bullocky Point, NTM S.10411-024, 6(6), 34.3-47.0 mm SL; Darwin, East Point, NTM S.10696-019, 3(3), 39.4-45.7 mm SL; Coburg Peninsula, Coral Bay, NTM S.10016-009, 13(6, 21.7-51.9 mm SL; 4 specimens, 21.7-51.9 mm SL, cleared and stained), 9.5-51.9 mm SL; Gulf of Carpentaria, Groote Eylandt, USNM 174251, 1(0); Gulf of Carpentaria, Pellew Group, Wanderlin Id, AMS IA.1558, 1(1), 45.5 mm SL. QUEENSLAND, AUSTRALIA: Gulf of Carpentaria, 17°14'S 159°52'E, AMS I.15557-296, 1(1), 31.6 mm SL.

CYPHO Myers

Nesiotes De Vis, 1884: 453 (type species: *Nesiotes purpurascens* De Vis by monotypy; preoccupied in Mollusca by *Nesiotes* Martens, 1860, and in Insecta by *Nesiotes* Wollaston, 1861, and *Nesiotes* Staal, 1873).

Cypho Myers, 1940: 35 (type species: *Nesiotes purpurascens* De Vis by original designation).

DIAGNOSIS: *Cypho* is distinguished from all other pseudochromid genera by the following combination of external characters: dorsal-fin rays III,22-24 (rarely 22 or 24); anal-fin rays III,13-15 (rarely 13 or 15); no scale sheaths on dorsal or anal fins; few to most anterior segmented dorsal-fin rays unbranched; and 14-17 (usually 16) circumpeduncular scales. Osteologically it is distinct in having in combination an anterior dorsal-fin pterygiophore formula of S*/S/S + 3/1 + 1/I/1/1/1/I/1/I/1/1/1/1/1 + 1*/1, and the posterior lamina of the first dorsal-fin pterygiphore confined to the distal end of the bone. The presence of dark oblique lines centrally on at least some anterior body scales further distinguishes the genus.

REMARKS: *Cypho* contains two sexually dimorphic species (one new) from the Western Pacific. Based on the relatively low dorsal- and anal-fin ray counts, Fowler (1931b) placed De Vis's *Nesiotes purpurascens* in *Pseudochromis* within the subgenus *Assiculus*. The two *Cypho* species are readily distinguished from *Assiculus* in having, for example, only 10 + 16 vertebrae (versus 11 + 17-18 in *Assiculus*), 14-17 (with a strongly modal count of 16) circumpeduncular scales (versus 17-21, usually 20), three more-or-less equal-sized supraneural bones (versus third vestigial or absent) and 13-15, modally 14 segmented anal-fin rays (versus 12-14, modally 13). The combination of modally 23 segmented dorsal-fin rays, modally 14 segmented anal-fin rays and a few to most anterior segmented dorsal-fin rays unbranched readily distinguishes *Cypho* from all other pseudochromine genera. The combination of an anterior dorsal-fin pterygiophore formula of S*/S/S + 3/1 + 1/1/1/1/1/1/1/1/1/1/1/1/1 + 1*/1 and the posterior lamina of the first dorsal-fin pterygiophore confined to the distal end of the bone is unique within the family.

ETYMOLOGY: From the Greek *kyphos*, meaning bent or humpbacked, a misnomer since Myers based this namc on *Nesiotes purpurascens* (*non* De Vis) Herre (1936) (= *Pseudochromis fuscus* Müller and Troschel). This species has a relatively highly arched predorsal profile whereas it is only weakly arched in true *C. purpurasceus*. Gender is neuter.

Key to species of *Cypho*

1a. Central dark lines on scales on anterior part of body aligning to form oblique bars; predorsal scales extending anteriorly to point ranging from mid AIO to midway between anterior AIO and posterior nasal pores (usually to mid or anterior AIO pores) (southwestern Pacific) ..... *C. purpurascens*

1b. Central dark lines on scales, if present, not aligning to form oblique bars; predorsal scales extending anteriorly to point ranging from anterior AIO to posterior nasal pores (Ryukyu Ids, Taiwan, Batan Ids, Luzon and northeastern Indonesia) ..... *C. zaps* sp. nov.

Cypho purpurascens (De Vis)
Oblique-lined Dottyback
Figure 8; Plates 1D-F

Pseudochromis adustus [*non* Müller & Troschel, 1849]; Günther, 1873: 410 (list; Solomon Ids).

Nesiotes purpurascens De Vis, 1884: 453 (type locality: South Seas); Fowler, 1928: 189 (compilation).

Pseudochromis (Pseudochromis) purpurascens; McCulloch, 1926: 188, pl. 49 (description; New Hebrides).

Pseudochromis purpurescens [sic]; Fowler, 1931a: 332.

Pseudochromis (Assiculus) purpurasceus; Fowler, 1931b: 22 (compilation).

Pseudochromis mccullochi Myers, 1932: 30 (type locality: Ringdove Bay, New Hebrides); Fowler, 1934: 412 (list; not synonymy); Fowler, 1949: 88 (compilation; not synonymy); Whitley, 1964b: 154 (Coringa Islet and Wreck Reef, Coral Sea); Russell, 1983: 44 (list, Capricorn-Bunker Group, Great Barrier Reef); Burgess et al., 1988: 209, pl. 152 (colour fig.).

Pseudochromis mccullochi perpulcher Whitley, 1959: 313 (type locality: Heron Id, Queensland, Australia); Whitley, 1964a: 42 (list).

Pseudochromis maccullochi; Debelius, 1984b: 425 (colour fig.).

Pseudochromis purpurascens; Debelius, 1986: 12 (colour fig.); Kailola, 1987: 244 (list, Papua New Guinea); Paxton et al., 1989: 520 (list; distribution).

Cypho purpurascens; Coleman, 1989: 25 (colour fig.); Gill, 1990b: 124 (description; distribution; colour fig.); Lowe & Russell, 1990: 8 (list; distribution); Burgess et al., 1991: 203 (colour fig.); Gill & Reader, 1992: 203 (list, Middleton and Elizabeth Reefs); Kuiter, 1992: 43, fig. c (colour fig.; habitat and distribution); Gill, 1993: 39 (colour figs; sexual dimorphism; habitat and distribution); Fosså & Nilsen, 1993: 129 (colour fig.; distribution); Lieske & Myers, 1994: pl. 33, fig. 1 (colour fig.; habitat and distribution); Gill, 1997: 124 (description; distribution; colour fig.); Allen, 1997: 96, pl. 29-17 (description; distribution; col. fig.); Gill, 1999b: 2570 (description; distribution; fig.).

DIAGNOSIS: *Cypho purpurascens* is distinguished from its congener in having the central dark lines on the anterior body scales aligned to form oblique bars, and in having the predorsal scales usually reaching anteriorly to the vicinity of the mid to anterior AIO pores.

DESCRIPTION (based on 76 specimens, 27.2-57.7 mm SL): dorsal-fin rays III,22-24, last 7-20 segmented rays branched; anal-fin rays III,13-15, last 8-14 segmented rays branched; pectoral-fin rays 17-19; upper procurrent caudal-fin rays 5-7; lower procurrent caudal-fin rays 4-6; total caudal-fin rays 26-31; scales in lateral series 30-37; anterior lateral-line scales 23-32; anterior lateral line terminating beneath segmented dorsal-fin ray 14-20; posterior lateral-line scales 3-9 + 0-3; scales between lateral lines 2-4; horizontal scale rows above anal-fin origin 11-14 + 1 + 2-4 = 14-18; circumpeduncular scales 16-17; predorsal scales 13-18; scales behind eye 2-4; scales to preopercular angle 3-6; gill rakers 4-7 + 10-13 = 14-19; pseudobranch filaments 8-13; circumorbital pores 17-35; preopercular pores 10-27; dentary pores 4-5; posterior interorbital pores 0.

Lower lip usually complete, sometimes incomplete with a weak to moderate symphyseal interruption; dorsal and anal fins without distinct scale sheaths, although intermittent scales sometimes overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of mid AlO to midway between anterior AIO and posterior nasal pores; opercle with 3-8 usually small, indistinct serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or with well-developed teeth confined to raker tips; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1/1/1/1/1/1/1/ 1/1 + 1*/1; dorsal-fin spines slender, tips moderately pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1/1/1/ 1 + 1*/1 or 3/1 + 1/1/1 + 1/1/1; anal-fin spines slender and moderately pungent to flexible, second spine about as stout as third; pelvic-fin spine slender, tip weakly pungent to flexible; second segmented pelvic-fin ray usually longest, third ray rarely slightly longer; caudal fin rounded; vertebrae 10 + 16; epineurals 12-13; epurals 3.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-2 (on sides of jaw) irregular rows of small conical teeth, outermost of rows of teeth much larger and more curved than those of inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical to caniniform teeth, those on middle of jaw enlarged and caniniform; vomer with 2-4 rows of small conical teeth arranged in chevron; palatine with 2-4 irregular rows of small conical teeth arranged in ovoid patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 20 specimens, 27.2-56.0 mm SL): head length 24.0-27.9; orbit diameter 8.0-10.7; snout length 5.0-6.6; fleshy interorbital width 3.7-5.1; bony interorbital width 2.8-3.4; body width 10.6-13.2; snout tip to posterior tip of retroarticular bone 13.6-16.3; predorsal length 30.9-35.5; prepelvic length 30.6-34.3; posterior tip of retroarticular bone to pelvic-fin origin 17.0-22.6; dorsal-fin origin to pelvic-fin origin 26.8-30.1; dorsal-fin origin to middle dorsal-fin ray 34.2-37.8; dorsal-fin origin to anal-fin origin 38.2-42.9; pelvic-fin origin to anal-fin origin 23.6-30.2; middle dorsal-fin ray to dorsal-fin termination 23.0-27.8; middle dorsal-fin ray to anal-fin origin 25.1-29.6; anal-fin origin to dorsal-fin termination 35.2-40.1; anal-fin base length 29.2-32.8; dorsal-fin termination to anal-fin termination 13.9-16.5; dorsal-fin termination to caudal peduncle dorsal edge 8.6-10.8; dorsal-fin termination to caudal peduncle ventral edge 16.9-18.1; anal-fin termination

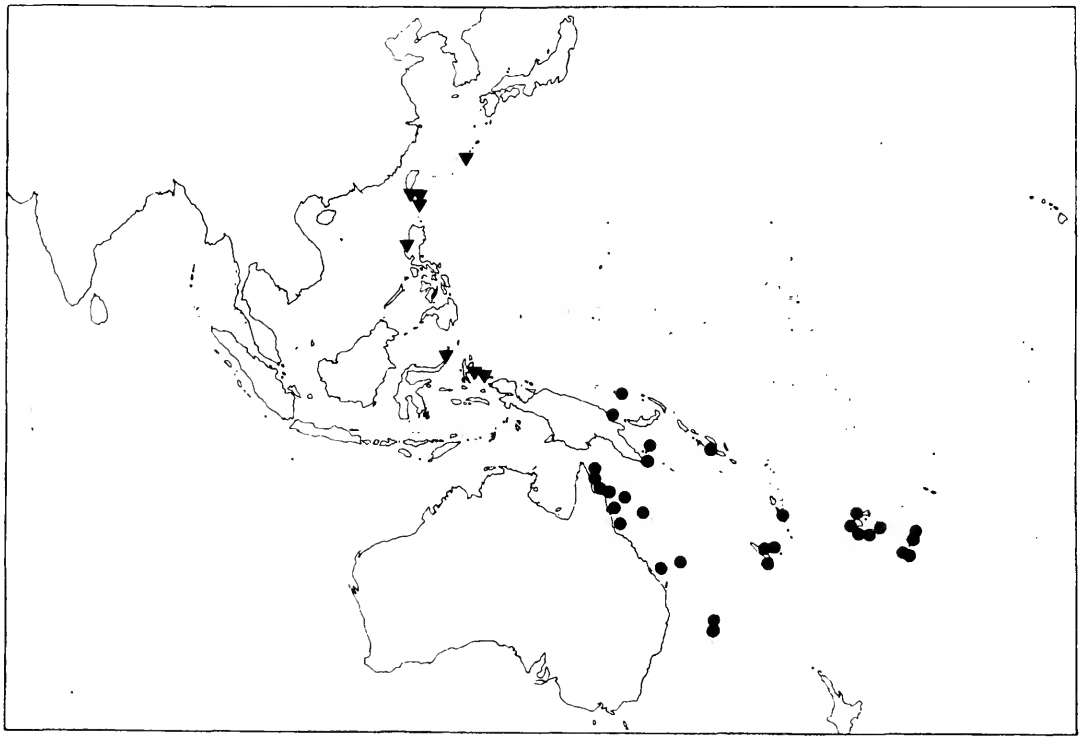

Figure 8. Distributional records for *Cypho purpurascens* (closed circles) and *C. zaps* (triangles).

to caudal peduncle dorsal edge 18.1-19.6; anal-fin termination to caudal peduncle ventral edge 10.0-12.3; first dorsal-fin spine 2.1-4.6; second dorsal-fin spine 3.6-8.0; third dorsal-fin spine 6.1-8.9; first segmented dorsal-fin ray 11.8-16.0; fourth last segmented dorsal-fin ray 14.6-20.6; first anal-fin spine 1.6-3.9; second anal-fin spine 4.0-6.5; third anal-fin spine 6.7-9.5; first segmented anal-fin ray 11.5-14.3; fourth last segmented anal-fin ray 13.4-20.6; third pectoral-fin ray 15.6-17.3; pelvic-fin spine 8.9-11.6; second segmented pelvic-fin ray 19.9-26.4; caudal-fin length 25.1-29.0.

Live coloration: Females (based on colour photographs of specimens from the Great Barrier Reef, the Tasman Sea, New Caledonia, Papua New Guinea, the Solomon Ids and Fiji, field observations on the Great Barrier Reef and in the Tasman Sea, and captive specimens; Plate 1D): head and body dark olive to purplish brown, paler ventrally and sometimes pale yellowish brown posteriorly, with pale pink to bright red area above anterior part of anal fin; dorsal contour of head and snout usually pinkish brown to red with scattered turquoise to bright green spots; mauve to bright blue line extending around posteroventral rim of orbit to upper lip, then along anterior edge of first infraorbital; cheek and operculum scales with intermittent purple to dark blue oblique bars and irregular markings, usually with large bright yellow to orange spot or short bar on cheek behind eye, with similar bright yellow to orange spot or short bar on anterior part of operculum just behind vertical part of preopercle; iris bright red with dark blue to turquoise suboval ring around pupil; each scale of anterior part of body with central dark purple to dark blue oblique line, these aligning to form oblique bars along transverse scale rows; oblique bars becoming broken and indistinct posteriorly; dorsal fin yellowish to greenish brown with several horizontal rows of brown to dark brown spots and streaks, these forming broken stripes along fin; distal margin of fin bright blue, sometimes red submarginally; anal fin similar to dorsal except darker, sometimes with red basal stripe; caudal fin yellowish to greenish brown with several convex to vertical rows of mauve to dark brown spots; pectoral fins hyaline; pelvic fins greyish to pinkish hyaline. Males (based on colour photographs of specimens from the Great Barrier Reef, Tasman Sea, New Caledonia, Papua New Guinea, the Solomon Ids and Fiji, field observations on the Great Barrier Reef and in the Tasman Sea and captive specimens; Plates 1E-F): head and anterior part of body bright orange to bright red becoming crimson posteriorly; dorsal contour of head and snout sometimes with scattered pink to mauve spots; mauve to bright blue or black line extending around posteroventral rim of orbit to upper lip, then along anterior edge of first infraorbital; cheek and operculum scales with intermittent mauve to bright blue or black oblique bars and irregular markings; iris bright orange to red with oblique dark blue bars above and below pupil; oblique bars on body similar to in females except bright blue to magenta or black in coloration; dorsal fin bright orange to crimson with bright blue distal margin, sometimes with one to three large gold-edged black spots midanteriorly on fin; anal fin bright red to crimson with bright blue distal margin and parallel bright blue stripe through distal third of fin, area between blue stripes bright red to reddish grey; caudal fin bright red to crimson, sometimes with broad dusky red posterior border, with grey to bright blue distal margin; pectoral fins pinkish hyaline; pelvic fins pinkish hyaline, sometimes red basally.

Preserved coloration: Females: pattern similar to live coloration, brown areas remaining; pale pink to bright red areas becoming pale yellowish brown; blue to purple head and body markings becoming dark brown to dark grey; dorsal, anal and caudal fins becoming pale brown to brown, fin spots becoming brown to dark brown; pectoral fins hyaline; pelvic fins becoming pale brown to hyaline. Males: pattern similar to live coloration, bright orange to crimson areas becoming pale yellowish to whitish brown; mauve, blue, magenta and black markings on head, body and fins becoming dark brown to dark grey; pectoral fins hyaline; pelvic fins becoming pale yellowish brown to hyaline.

HABITAT AND DISTRIBUTION: *Cypho purpurascens* is known only from the southwest Pacific, from the Great Barrier Reef north to the Admiralty Ids, south to Elizabeth Reef and east to Tonga (Figure 8). It has been collected and observed (pers. obs.) around rock and coral reefs in a variety of habitats including tidal pools, lagoon patch reefs, surge channels and reef drop-offs at depths ranging to 38 m.

COMPARISONS: As noted in the above diagnosis, the two species of *Cypho* are distinguished primarily and most easily on the basis of coloration. Both species have dark lines through the centre of each anterior body scale; in *C. purpurascens* these align to form oblique bars whereas they do not align in *C. zaps*. The two species also differ in several meristic features, despite considerable overlap in count ranges. *Cypho purpurascens* tends to have higher numbers of pectoral-fin rays (17-19, modally 18 versus 16-19, modally 17), fewer peduncular lateral-line scales (3-9, usually 5-7 versus 3-13, usually 6-9), and more scales to preopercular angle (3-6, modally 4 versus 3-4, modally 3) than *C. zaps* (see Appendix 1). They also tend to differ in the extent to which the predorsal scales extend anteriorly on the head; in *C. purpurascens* predorsal scales usually extend to the vicinity of the mid to anterior AIO pores, whereas in *C. zaps* they usually extend further forward to a point ranging from the vicinity of the anterior AIO to the posterior nasal pores (Appendix 1).

Cypho purpurascens is unlikely to be confused with species of other pseudochromid genera. Aside from the diagnostic characters for *Cypho* discussed under *Remarks* for the generic account, the presence of dark oblique bars on the anterior part of the body readily distinguishes it from all other pseudochromids; these develop early soon after settlement and persist even following long preservation.

REMARKS: *Cypho purpurascens* is a moderate-sized species; the largest specimen examined measured 65.0 mm SL. Gill (1993, 1997) and Fosså & Nilsen (1993) provide photographs of females of the species, and Coleman (1989), Debelius (1984b; 1986), Kuiter (1992) and Gill (1993, 1997) have illustrated males; Burgess et al. (1988; 1991), and Gill (1990b; 1993) illustrate males with dorsal-fin ocelli. The sexual relationships of the colour forms are based on macro-examination of gonads of museum specimens and on field observations of breeding (Thresher, 1984) and non-breeding pairs (pers. obs.). Although the sizes of specimens of the two sexual colour forms broadly

overlap, this species appears to be a sequential hermaphrodite. Several of the museum specimens examined and several freshly dead specimens from Middleton and Elizabeth Reefs had colourations intermediate between the colour forms. Two of the former had testicular tissue dorsally and ovarian tissue ventrally. In addition, an aquarium specimen changed from typical male to female coloration over a period of about two weeks (pers. obs.), suggesting protandry. However, considering the reproductive complexity noted by Ferrell (1987) for *Ogilbyina queenslandiae* (see *Remarks* for that species), this needs further study and verification.

The nomenclature of this species has been considerably confused. De Vis (1884) described *Nesiotes purpurascens* on the basis of an unspecified number of specimens from the "South Seas". McCulloch (1926) examined two specimens labelled as syntypes of the species in the Queensland Museum and described and illustrated a specimen from New Hebrides that he stated was conspecific with the types. However, he noted (p. 186) that the types differed considerably from De Vis' original description (e.g., in recording 12 instead of three dorsal-fin spines) and attributed this to "the notorious inaccuracies of De Vis' writings." Myers (1932) indicated that the "true" *Nesiotes purpurascens* had been collected by Herre and proposed the name *Pseudochromis mccullochi* for McCulloch's species. Herre published a figure and description of his specimen in 1936. This specimen was later listed as the neotype of *N. purpurascens* by Grey (1947). However, Grey's designation is invalid since it does not conform to several mandatory conditions imposed by the International Commission on Zoological Nomenclature (1999: Article 75; e.g., connection with a revisory work, non-association with a matter of mere curatorial routine). Ibarra & Stewart (1987: 60) also listed Herre's specimen as the neotype of *N. purpurascens*, wrongly attributing neotype designation to Herre (1936). A radiograph of Herre's specimen was examined in the present study and additional information on the specimen was provided by T. Grande; it is referable to *Pseudochromis fuscus*. De Vis's description is clearly not based on that species and there is no reason to dispute the type status of the Queensland Museum specimens. For example, De Vis's miscount of 12 instead of three dorsal-fin spines can be explained by the presence of nine unbranched segmented rays at the anterior of the dorsal fin in the larger of the two syntypes; presumably De Vis mistook these for spines. The other discrepancies noted by McCulloch (1926) are minor and could be attributed to differences in terminology and methodology.

The holotype of *Pseudochromis mccullochi perpulcher* Whitley (AMS IB.3996) could not be located in the Australian Museum. However, the description is clearly based on a male of *C. purpurascens*.

ETYMOLOGY: The specific epithet is from the Latin *purpura*, purple, with apparent reference to the preserved coloration of the syntypes: "purplish brown" (De Vis, 1884: 454).

MATERIAL EXAMINED: "SOUTH SEAS": QM I.1351, 2(2), 50.8-52.0 mm SL (syntypes of *N. purpurascens* De Vis). PAPUA NEW GUINEA: Admiralty Ids, Los Negros Id, BMNH 1983.3.25.239, 1(0), WAM P.27825-029, 1(1), 47.0 mm SL; Bagabag Id, USNM 246237, 2(2), 41.4-47.3 mm SL; Trobriand Ids, Kiriwina Id, USNM 290709, 4(0); Trobriand Ids, Kiriwina, off Towai Point, USNM 290083, 1(0); Egum Atoll, Yanaba Id, USNM 290657, 1(0). GREAT BARRIER REEF, AUSTRALIA: no locality data, AMS I.31554-003, 3(3), 39.5-45.8 mm SL (cleared and stained); Raine Id, AMS I.20775-090, 3(0), 50.0-55.0 mm SL; Sir Charles Hardy Ids, South Id, AMS I.20770-117, 1(0), 49.0 mm SL; Cape York, Tijou Reef, AMS I.20779-186, 16(0), 29.0-53.0 mm SL, QM I.16045, 5(5), 33.6-56.0 mm SL; off Bathurst Bay, Hilder Reef, CAS 56783, 1(0); channel between Yonge and Carter Reefs, AMS I.19456-071, 31(7, 27.2-48.4 mm SL), 16.0-48.4 mm SL; Escape Reef, AMS I.22573-004, 3(3), 33.2-38.6 mm SL, AMS I.31552-001, 1(1), 47.5 mm SL (cleared and stained), AMS I.31552-002, 1(1), 39.9 mm SL; Dunk Id, AMS I.20965-028, 2(0), 29.0-54.0 mm SL; Capricorn-Bunker Group, One Tree Id, AMS I.15640-019, 10(7, 33.7-52.5 mm SL), 33.7-52.5 mm SL; AMS I.15682-021, 8(0), 47.0-65.0 mm SL. CORAL AND TASMAN SEAS, AUSTRALIA: Bougainville Reef, BPBM uncat., 1(1), 49.9 mm SL, BPBM 31764, 1(0), 53.0 mm SL; Lithou Reef, Anne Cay, WAM P.29638-027, 1(0), 15.5 mm SL; Coringa Islet, AMS IB.4954, 1(0), Coringa Islets, Chilcott Id, WAM P.29635-016, 2(0), 15.0-16.0 mm SL; Wreck Reef, Bird Islet, AMS IB.4953, 1(0); Herald Group, North East Cay, AMS IB.7839, 1(1), 51.0 mm SL; Middleton Reef lagoon, AMS I.27138-018, 27(5, 48.6-57.7 mm SL), 38.0-59.0 mm SL; Elizabeth Reef lagoon, AMS I.27156-001, 10(5, 32.8-57.0 mm SL), 32.8-55.7 mm SL. SOLOMON IDS: BMNH 1871.3.29.119, 1(1), 54.1 mm SL; Russell Ids, N end of Mane Id (09°00'06"S 159°01'14"E), BPBM 35839, 3(3), 50.4-55.4 mm SL. NEW CALEDONIA: MNHN 1980-505, 1(1), 52.1 mm SL; Noumea, 1 km NE of Dumbea Pass, BPBM 14616, 1(0), 55.0 mm SL; Bai Kuakue, USNM 257175, 1(1), 49.1 mm SL; Loyalty Ids, Ouve'a Id, off Ilots Deguala, BPBM 27076, 1(0), 46.0 mm SL, BPBM 27077, 5(3, 29.3-54.6 mm SL), 17.0-54.6 mm SL. VANUATU (NEW HEBRIDES): Epi (Api) Id, Ringdove Bay, AMS IA.798, 1(1), 49.1 mm SL (holotype of *P. mccullochi* Myers); Efate Id, off Malapoa Peninsula, AMS I.17472-059, 3(3), 39.3-51.9 mm SL; Efate Id, Villa Harbour, CAS 6047, 1(0), 45.9 mm SL; Efate Id, off Erakor Isle, AMS I.17473-019, 3(0), 37.0-41.0 mm SL. FIJI: Charybdis Reef, USNM 257160, 2(0); Malolo Id, USNM 243322, 2(0); Viti Levu, Suva Harbour, Bay of Islands, Bird Id, AMS I.18354-022, 1(1), 53.2 mm SL; Viti Levu, Mbengga Id, ANSP 158205, 3(0), 35.2-43.0 mm SL, ANSP 158206, 2(0), 26.5-49.5 mm SL; Bega lagoon, AMS I.18360-001, 6(0), 28.0-48.0 mm SL; Kandavu Id, Ndaku Bay, USNM 257155, 3(0); Lau Group, Matuka Id, USNM 257157, 37(7, 35.8-46.0 mm SL), 20.0-46.7 mm SL; Lau Group, Yagasa Cluster, USNM 257159, 7(0). TONGA: Vava'u Group, Neiafu Id, ANSP 158230, 11(11), 35.7-47.5 mm SL; Ha'apai Group, Lifuka Id, USNM 334177, 35(0); Ha'apai Group, Uoleva Id, USNM 334175, 8(0); Tongatapu Group, Malinao Id, USNM 334242, 15(0); Tongatapu Group, reef N of Atata Id, USNM 334079, 4(0); Tongatapu Group, Makaha'a Id, USNM 334241, 8(0); Tongatapu Group, Eua Id, USNM 334238, 37(0).

Cypho zaps sp. nov.

Checkered Dottyback

Figures 8-10; Plate 1G

Pseudochromis aureus [*non* Seale, 1910]; Shen, 1984: fig. 291.7a (Lan-yü, Taiwan).

Cypho sp.; Shen, 1994: 958, fig. 19 (colour fig.; Taiwan); Gill,

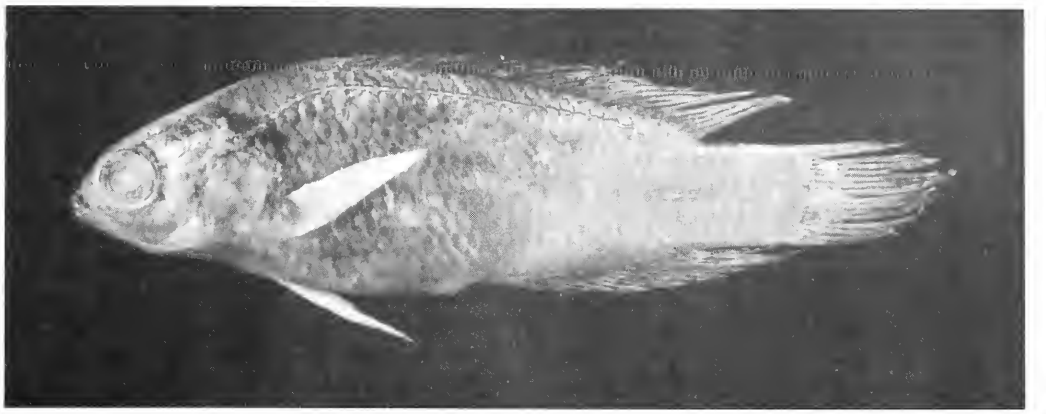

Figure 9. *Cypho zaps*, ANSP 163547, 40.5 mm SL, female paratype, Chawa Point, Batan Id, Batan Ids, Philippines. (Photo by P. Crabb)

1999b: 2562 (key).

HOLOTYPE: USNM 291625, 35.4 mm SL, Philippines, Batan Ids, Batan Id, White Beach, coral and encrusted boulders, 15-21 m, G.D. Johnson and W.F. Smith-Vaniz, 2 May 1987.

PARATYPES: USNM 290945, 1: 51.0 mm SL, Taiwan, off Ch'uan-fan-shih, 7.5-8 m, V.G. Springer et al., 30 April 1968; RUSI 34979, 1: 49.5 mm SL, Taiwan, Kenting National Park, off Houpihu, 22°06'N 120°45'E, P.C. Heemstra, 20 January 1988; ASIZT P.057275, 1: 43.4 mm SL, Taiwan, Green Id (Lu Tao Id), Ta-Pai-Sha, 26 m, J.-P. Chen, 24 October 1993; BMNH 1999.12.30.1, 1: 48.0 mm SL, Taiwan, Green Id (Lu Tao Id), Kuein-Wan, 6 m, J.-P. Chen, 29 May 1993; ASIZT P.057276, 2: 28.0-40.8 mm SL, Taiwan, Orchid Id, Lang-Tao, 10 m, J.-P. Chen, 8 May 1993; BMNH 1999.12.30.2, 1: 37.7 mm SL, Taiwan, Orchid Id, 10 m, J.-P. Chen, 18 November 1992; USNM 291602, 3: 39.3-43.3 mm SL, Philippines, Batan Ids, Y'ami Id, 15-19.5 m, G.D. Johnson, W.F. Smith-Vaniz et al., 26 April 1987; AMS I.39543-001, 4: 33.7-38.3 mm SL, Philippines, Batan Ids, Batan Id, White Beach, coral and encrusted boulders, 9-12 m, G.D. Johnson and W.F. Smith-Vaniz, 1 May 1987; NSMT-P 46416, 1: 34.6 mm SL, collected with AMS I.39543-001; USNM 291601, 9: 30.4-40.6 mm SL, collected with AMS I.39543-001; USNM 291627, 3: 42.0-43.1 mm SL, Philippines, Batan Ids, Batan Id, White Beach, surge channel at outer edge of reef flat, coral and walls of channel, 0-6 m, G.D. Johnson, W.F. Smith-Vaniz et al., 22 April 1987; USNM 304577, 7: 33.6-37.5 mm SL, same data as holotype; ANSP 163457, 6: 39.7-43.8 mm SL, Philippines, Batan Ids, Batan Id, Chawa Point (20°25'45"N 121°56'40"E), G.D. Johnson and W.F. Smith-Vaniz, 1 May 1987; USNM 291626, 2: 31.7-38.0 mm SL, Philippines, Batan Ids, Sabtang Id, Duvuck Bay, 18-24 m, G.D. Johnson, W.F. Smith-Vaniz et al., 4 May 1987; USNM 293355, 1: 36.8 mm SL, Philippines, Batan Ids, Sabtang Id, Duvuck Bay; 18-21 m, G.D. Johnson, W.F. Smith-Vaniz et al., 3 May 1987; USNM 339204, 1: 31.2 mm SL, Philippines, Luzon, off Balinao, Balingasay Reef, base of sloping rock wall with small surge channel and sand flat, 21-24 m, J.T. Williams and V. Albaladejo, 9 October 1995; BPBM 34228, 1: 41.4 mm SL, Indonesia, island E of N end of Kawe Id, reef in 2 m, J.E. Randall, 19 October 1989.

DIAGNOSIS: *Cypho zaps* is distinguished from its congener in having the central dark lines on scales, if present, not aligning to form oblique bars, and in usually having the predorsal scales extend anteriorly to a point ranging from anterior AIO to posterior nasal pores.

DESCRIPTION (based on 46 specimens, 30.4-51.0 mm SL; minimum and maximum value ranges given first for all type specimens, followed, where different, by values for holotype enclosed in parentheses): dorsal-fin rays III,22-23 (III,23), last 8-17 (9) segmented rays branched; anal-fin rays III,14, all or all but first 1-2 (1) segmented rays branched; pectoral-fin rays 16-19 (17/17); upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 5-6 (5); total caudal-fin rays 28-30 (28); scales in lateral series 29-37 (35/33); anterior lateral-line scales 24-31 (28/27); anterior lateral line terminating beneath

Figure 10. *Cypho zaps*, ANSP 163547, 43.4 mm SL male paratype, Chawa Point, Batan Id, Batan Ids, Philippines. (Photo by P. Crabb)

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2469975

segmented dorsal-fin ray 15-21 (17/18); posterior lateral-line scales 3-13 + 0-2 (7 + 1/6 + 1); scales between lateral lines 2-4 (3/2); horizontal scale rows above anal fin origin 11-14 + 1 + 2-4 = 14-18 (12 + 1 + 3/11 + 1 + 3); circumpeduncular scales 14-16 (14); predorsal scales 13-18 (15); scales behind eye 2-4 (3); scales to preopercular angle 3-4 (3); gill rakers 3-5 + 9-11 = 13-16 (4 + 10); pseudobranch filaments 7-14 (10); circumorbital pores 16-26 (20/20); preopercular pores 8-16 (10/10); dentary pores 4-5 (4/4); posterior interorbital pores 0.

Lower lip usually complete, sometimes incomplete with weak to moderate symphyseal interruption; dorsal or anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of mid AIO to posterior nasal pores; opercle with 3-6 usually small, indistinct serrations; teeth of outer ceratobranchial-1 gill rakers usually either weakly developed or well-developed only on raker tips, although well-developed teeth may run most of length for upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1/1/1/1/1/1/1 + 1*/1 (S/S/S + 3/1 + 1/1/1/1/1/1/1/1/1/1/1/1 + 1); dorsal-fin spines slender, tips moderately pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1 + 1* (3/1 + 1/1/1); anal-fin spines slender and moderately pungent to flexible, second spine about as stout as third; pelvic-fin spine slender, tip weakly pungent to flexible; second segmented pelvic-fin ray longest, rarely third slightly longer; caudal fin rounded; vertebrae 10 + 16; epineurals 12-14 (14); epurals 3.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-2 (on sides of jaw) irregular rows of small conical teeth, outermost of rows of teeth much larger and more curved than those of inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical to caniniform teeth, those on middle of jaw enlarged and caniniform; vomer with 2-4 rows of small conical teeth arranged in chevron; palatine with 2-4 irregular rows of small conical teeth arranged in ovoid patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 18 specimens, 30.4-51.0 mm SL): head length 23.1-27.0 (25.1); orbit diameter 8.0-10.9 (9.9); snout length 4.8-6.3 (5.1); fleshy interorbital width 4.5-5.6 (4.8); bony interorbital width 2.8-3.7 (3.1); body width 11.4-14.8 (12.4); snout tip to posterior tip of retroarticular bone 13.2-15.1 (14.7); predorsal length 30.5-35.2 (32.8); prepelvic length 29.6-33.4 (32.2); posterior tip of retroarticular bone to pelvic-fin origin 17.3-20.5 (18.6); dorsal-fin origin to pelvic-fin origin 26.9-30.6 (28.0); dorsal-fin origin to middle dorsal-fin ray 35.0-37.8 (37.3); dorsal-fin origin to anal-fin origin 39.4-42.5 (41.5); pelvic-fin origin to anal-fin origin 25.3-30.6 (26.3); middle dorsal-fin ray to dorsal-fin termination 23.3-27.3 (26.3); middle dorsal-fin ray to anal-fin origin 26.0-27.9 (28.8); anal-fin origin to dorsal-fin termination 35.0-39.0 (37.3); anal-fin base length 28.1-32.0 (30.8); dorsal-fin termination to anal-fin termination 13.3-16.8 (15.8); dorsal-fin termination to caudal peduncle dorsal edge 8.9-11.4 (10.2); dorsal-fin termination to caudal peduncle ventral edge 15.9-18.7 (18.1); anal-fin termination to caudal peduncle dorsal edge 17.1-20.1 (18.9); anal-fin termination to caudal peduncle ventral edge 10.7-12.9 (11.9); first dorsal-fin spine 1.7-3.2 (2.3); second dorsal-fin spine 4.1-5.7 (4.5); third dorsal-fin spine 5.8-7.7 (7.1); first segmented dorsal-fin ray 9.9-13.8 (13.0); fourth last segmented dorsal-fin ray 17.7-21.8 (18.9); first anal-fin spine 1.6-3.9 (2.3); second anal-fin spine 3.9-6.7 (4.8); third anal-fin spine 5.8-9.0 (7.6); first segmented anal-fin ray 10.6-13.6 (12.1); fourth last segmented anal-fin ray 17.1-20.8 (18.1); third pectoral-fin ray 14.5-19.3 (18.4); pelvic-fin spine 8.8-11.0 (9.9); second segmented pelvic-fin ray 21.2-24.4 (23.2); caudal-fin length 25.2-32.3 (28.2).

Live coloration: Females: not known. Males (based on photographs of specimens from Indonesia, Taiwan and the Ryukyu Ids; Plate 1G): head and body bright orange to bright orange-red, becoming bright red to crimson or purple posteriorly; dorsal contour of head and nape sometimes dark grey; snout and interorbital area of head sometimes with a few to many scattered mauve or turquoise spots; mauve to blue or turquoise line extending around posteroventral rim of orbit to upper lip, then along anterior edge of first infraorbital; mauve to blue or turquoise line edged ventrally with dark grey to black; cheeks and operculum with intermittent mauve to dark blue oblique bars and spots; iris bright orange to bright red with two oblique blue to turquoise bars, one above and one below pupil; scales of body each with oblique dark grey to purple central bar, these not aligning with adjacent bars to form continuous oblique bars; dorsal and anal fins bright orange to crimson with two or three broadly spaced mauve to magenta stripes; distal margins of dorsal and anal fins bluish grey to bright blue, bordered proximally with bright red; caudal fin pinkish hyaline to bright red or crimson with dusky grey to bright blue distal margin; pectoral fins pinkish to orangish hyaline; pelvic fins pinkish hyaline to pale pink with pale blue anterior margin.

Preserved coloration: Females: head and body brown to dark grey-brown, paler ventrally; dark grey to dark brown line extending around posteroventral rim of orbit to upper lip, then along anterior edge of first infraorbital; cheeks and operculum with intermittent dark brown oblique bars and irregular markings; body scales each with dark brown oblique bar as in males, but bars often hidden by dark background coloration; area above anterior part of anal fin usually paler than surrounding body coloration; dorsal and anal fins brownish hyaline to dark brown with several horizontal rows of brown to dark grey-brown spots and streaks; caudal fin brown to dark grey-brown basally, becoming brownish hyaline to brown distally, usually with several convex to vertical rows of small dark brown to dark grey spots; pectoral fins hyaline; pelvic fins pale brown to hyaline. Males: pattern similar to live coloration, head and body becoming pale yellow to whitish brown; dark markings on head and body usually remain, becoming dark brown to dark grey, although dark oblique body scale markings sometimes absent; dorsal, anal and caudal fins becoming pale yellowish hyaline to hyaline with dusky grey to dark grey-brown distal margins; pectoral fins becoming hyaline; pelvic fins becoming pale yellowish brown to hyaline.

HABITAT AND DISTRIBUTION: *Cypho zaps* is currently known only from the Ryukyu Ids, Batan Ids, southern Taiwan, Luzon and northeastern Indonesia. In addition to the collection

localities for the material examined, it has recently been sighted and photographed by J.E. Randall in Indonesia on a reef in 18 m at Recovery Rock (0°40'N 129°1'35"E), east of Halmahera, by R.H. Kuiter at Siau Id, N of Sulawesi and by S. Inoue in 25 m at Yonaguni-jima, Okinawa, Ryukyu Ids (Figure 8). It has been collected from small caves and around corals and encrusted boulders on reef slopes and in reef surge channels at depths ranging from 2 to 26 m.

COMPARISONS: Characters distinguishing the two *Cypho* species are discussed under *Comparisons* for *C. purpurascens*. When present, the dark lines through the body scale centres readily distinguish *C. zaps* from members of other pseudochromid genera. Other features distinguishing the species are discussed under *Remarks* in the generic account.

REMARKS: *Cypho zaps* is a moderately small species; the largest specimen examined measured 51.0 mm SL. It exhibits similar sexual dimorphism in preserved coloration to its congener. Considering this and given the very similar live male colourations of the two *Cypho* species, it is likely that the ground coloration of live female *C. zaps* is similar to that of *C. purpurascens*. Shen (1984) illustrated a specimen of *C. zaps* from Taiwan. The identification of this specimen was confirmed from an examination of a radiograph. Based on the median fin coloration it appears to be a male, although it is more darkly coloured than the male specimen illustrated here (Plate 1G).

ETYMOLOGY: The specific name *zaps* is from the Greek meaning storm. Almost all of the type specimens (including the holotype) were collected in the Batan Ids, Philippines. The Smithsonian Institution team responsible for these collections was stranded on Y'ami Id for several days during a storm. To be treated as a noun in apposition.

MATERIAL EXAMINED (in addition to above type material): PHILIPPINES: Batan Ids, Batan Id, White Beach, USNM 304578, 6(0), 10.8-30.1 mm SL.

LABRACINUS Schlegel

Cichlops Müller & Troschel, 1849: 24 (type speeies: *Cichlops cyclophthalmus* Müller & Troschel by monotypy; preoccupied in Aves by *Cichlops* Hodgson, 1844).

Labracinus Hoeven, 1855: 386 (*nomen nudum*).

Labracinus Schlegel, 1858: 121 [type species: *Cichlops cyclophthalmus* Müller & Troschel by subsequent designation of Jordan (1919b: 383)].

Dampieria Castelnau, 1875: 30 (type species: *Dampieria lineata* Castelnau by monotypy).

DIAGNOSIS: *Labracinus* is distinguished from all other pseudochromid genera in having the following combination of external characters: dorsal-fin rays II,24-26 (usually 25), segmented anal-fin rays 13-15 (usually 14); scales in lateral series 52-74; and anterior lateral line-scales 43-67. Osteologieally it is unique among pseudochromines in having in combination 11 + 16-17 vertebrae and three equal-sized supraneural bones.

REMARKS: *Labracinus* closely resembles *Ogilbyina* in having scaly dorsal- and anal-fin bases, a complete lower lip, the posterior lamina on the first dorsal-fin pterygiophore running most of the length of the bone, and relatively small scales. Comparisons between these two genera are discussed under *Remarks* for *Ogilbyina*. Externally, the presence of only two dorsal-fin spines and small scale size (e.g., scales in lateral series 52-74, circumpeduncular scales 24-32) readily distinguishes *Labracinus* from all other pseudochromine genera. *Labracinus* species are also distinct in attaining a larger size than other pseudochromines (to 174 mm SL in *L. lineatus*).

The nomenclature of this genus has been considerably confused (see *Historical Review* section of the Introduction for further discussion). This has largely stemmed from confusion regarding the correct authorship and publication date for *Labracinus*. Most authors have overlooked Schlegel's (1858) first use of the name as a synonym under an account for *Cichlopsis cichlophthalmus* and have instead attributed authorship to Bleeker (1875). This oversight has raised a problem of date priority with *Dampieria* Castelnau (1875; see Böhlke, 1960: 2) and both names have been used by recent authors. Schultz (1967) correctly attributed authorship to Schlegel but did not discuss the confusion surrounding *Labracinus* authorship. Although *Labracinus* was proposed as a name in synonymy, it meets the requirements of availability since it was treated as available and adopted prior to 1961 by Gill (1904). Furthermore, although Gill mistakenly attributed authorship to Bleeker (1875), authorship dates from its first publication as a synonym (International Commission on Zoological Nomenclature, 1999: Article 11.6).

Schultz (1967) regarded *Cichlopsis cichlophthalmus* Schlegel (1858) to be a nominal taxon. However, it is here interpreted as an incorrect spelling of *Cichlops cyclophthalmus* Müller & Troschel (1849). The reason for this interpretation is the similarity in spelling of the genus and species names, eombined with the fact that the accompanying descriptions are clearly based on the same taxon. An even more convincing case could be made if Schlegel's description were found to be derived from that of Müller & Troschel. However, Sehlegel's deseription deviates in recording six cheek scales instead of seven and is therefore apparently original. Given that *Cichlopsis ciclophthalmus* Schlegel is not an available name, it cannot be used as type species for *Labracinus* on grounds of fixation by monotypy; Schultz's (1967) use of this name for type species of *Labracinus* is therefore not valid. Given that the type species of a genus introdueed in junior synonymy is not automatically the same as that of the senior synonym (*Cichlops*), type fixation dates at least to Jordan (1919b; International Commission on Zoological Nomenclature, 1999: Article 67.12).

Disregarding *Cichlops filamentosus* Macleay (= *Assiculus punctatus*), *Dampieria bitaeniata* Fowler (= *Pseudochromis bitaeniatus*), *D. longipinnis* Ogilby (= *Ogilbyina novaehollandiae*) and *Labracinus flavipinnis* Seale (= *Pseudochromis tapeinosoma*), a total of 13 nominal species of *Labracinus* have been described. In the only recent review of the genus, Schultz (1967) examined Indonesian, Philippine and Japanese specimens housed in various North American museums and recognised only four species as valid: *L.*

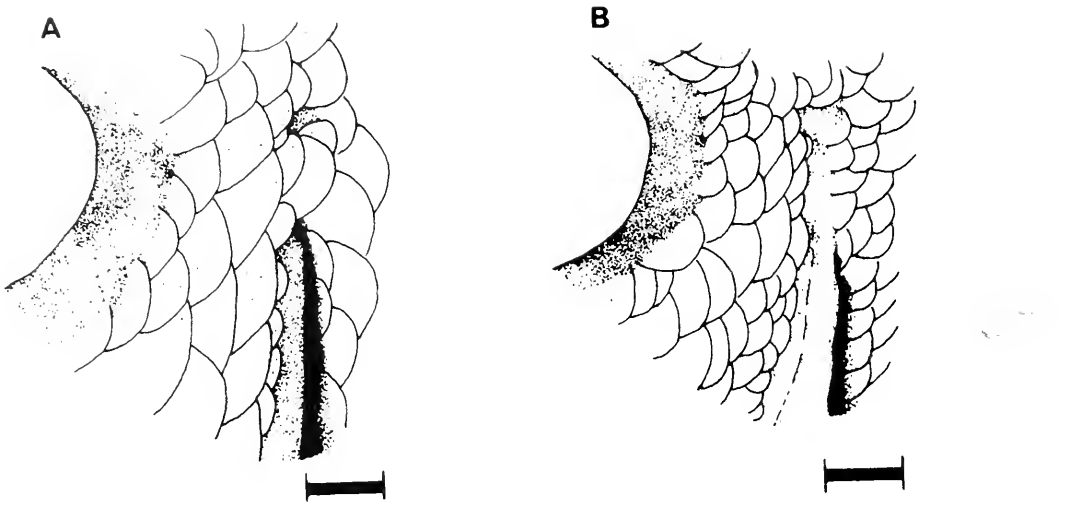

Figure 11. Upper part of the cheek of: A) *Labracinus cyclophthalmus*, LACM 42463-19, 97.8 mm SL, showing scales overlapping the dorsal portion of the preopercle; B) *L. lineatus*, WAM P.26668-002, 91.4 mm SL, showing the dorsal portion of the preopercle naked. Scale = 2 mm.

atrofasciatus (Herre), *L. cyclophthalmus* (Müller & Troschel) (with *Cichlops japonicus* Gill, *C. spilopterus* Bleeker, *C. helmuthii* Bleeker and *C. trispilos* Bleeker synonyms), *L. melanotaenia* (Bleeker) (with *C. melanotaenia altera* Bleeker and *Dampieria melanostigma* Fowler synonyms) and *L. lineatus* (Castelnau) (with *D. iguita* Scott and *D. ocellifera* Fowler synonyms).

Based on the examination of extensive collections of *Labracinus* (including almost all of the material examined by Schultz) and detailed examination of type material of all nominal species only three species are recognised here: *L. atrofasciatus*, *L. cyclophthalmus* (including as synonyms *D. ocellifera* and all of the nominal species referred to synonymy with *L. cyclophthalmus* and *L. melanotaenia* by Schultz, 1967) and *L. lineatus*. The latter species is endemic to Western Australia; Schultz's account for this species was based on misidentified *L. cyclophthalmus*.

ETYMOLOGY: The generic name is from the Latin *labrus*, a wrasse, and *inus*, pertaining to, and apparently alludes to the similarity to certain fishes of the family Labridae. Gender is masculine.

Key to species of *Labracinus*

1a. Horizontal scale rows above anal fin origin 24-25 + 1 + 5 = 30-31; pseudobranch filaments 23-24; circumpeduncular scales 32; in preservative a series of narrow (less than one scale wide) dark brown oblique bars on sides of body beneath posterior two-thirds of dorsal fin; a large (subequal to pupil) dark brown spot positioned on basal third of dorsal fin between segmented rays 21 and 24 (Culion, Philippines) ..... *L. atrofasciatus*

1b. Horizontal scale rows above anal fin origin 16-25 + 1 + 3-6 = 21-30 (usually 17-23 + 1 + 3-5 = 21-28); pseudobranch filaments 12-20; circumpeduncular scales 24-30; bars on sides of body, if present, broad (several scales wide) and confined to beneath anterior half of dorsal fin; spots if present at posterior of dorsal fin small (less than half pupil diameter). 2

2a. Dorsal portion of preopercle scaled (Figure 11A); scales in lateral series 52-68 (usually 65 or fewer); anterior lateral-line scales 43-62 (usually fewer than 56); oblique dark bars on cheeks usually distinct and straight-edged (southern Japan to northwestern Australia and Papua New Guinea) ..... *L. cyclophthalmus*

2b. Dorsal portion of preopercle naked (Figure 11B); scales in lateral series 61-74 (usually 65 or more); anterior lateral-line scales 53-67 (usually 55 or more); oblique bars on cheeks, if present, faint and more-or-less vermiform (Western Australia) ..... *L. lineatus*

***Labracinus atrofasciatus* (Herre)**

Black-barred Dottyback

Figures 12-13

Dampieria atrofasciatus Herre, 1933a: 17 (type locality: Culion, Philippines); Herre, 1934: 47 (list); Roxas & Martin, 1937: 123 (list); Böhlke, 1953: 69 (list); Herre, 1953: 370 (list).

Labracinus atrofasciatus; Schultz, 1967: 40, fig. 8 (description); Gill, 1999b: 2561 (key).

DIAGNOSIS: *Labracinus atrofasciatus* differs from congeners in having a series of narrow dark brown (in preservative) oblique lines on the side of the posterior part of the body, a large (subequal to pupil) dark spot basally on the posterior part of the dorsal fin, and a greater number of circumpeduncular scales (32).

DESCRIPTION (based on one specimen, 105.5 mm SL): dorsal-fin rays II,25, all segmented rays branched; anal-fin rays III,14, all segmented rays branched; pectoral-fin rays 20; upper procurrent caudal-fin rays 6; lower procurrent caudal-fin rays 5; total caudal-fin rays 28; scales in lateral series 60; anterior lateral-line scales 51-53; anterior lateral line terminating beneath segmented dorsal-fin ray 19; posterior lateral-line scales 18-19

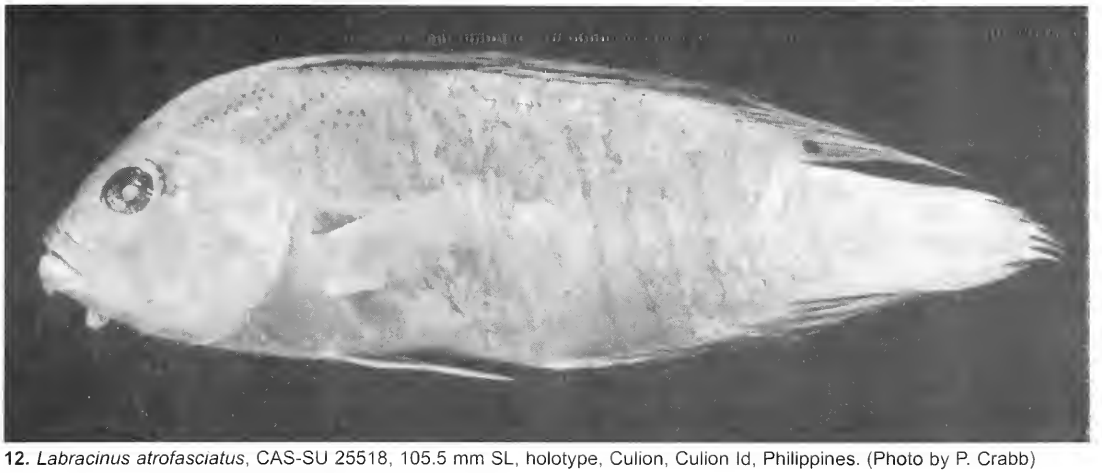

Figure 12. *Labracinus atrofasciatus*, CAS-SU 25518, 105.5 mm SL, holotype, Culion, Culion Id, Philippines. (Photo by P. Crabb)

+ 2; scales between lateral lines 7; horizontal scale rows above anal-fin origin 24-25 + 1 + 5 = 30-31; circumpeduncular scales 32; predorsal scales 34; scales behind eye 2; scales to preopercular angle 9; gill rakers 6-7 + 13-14 = 20; pseudobranch filaments 23-24.

Lower lip complete; dorsal and anal fins with well-developed scale sheaths; predorsal scales extending anteriorly to mid AIO pores; opercle relatively smooth without distinct serrations; outer ceratobranchial-1 gill rakers with well-developed teeth running most of length of upper rakers, these becoming restricted to distal halves and raker tips for lower rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1 + 1/1 + 1/1 + 1/1; dorsal-fin spines slender, tips flexible; anterior anal-fin pterygiophore formula 3/1 + 1/1/1/1/1/1/1 + 1/1/1 + 1/1 + 1; anal-fin spines relatively stout and pungent, second spine slightly stouter than third; pelvic-fin spine slender, tip weakly pungent; second segmented pelvic-fin ray longer or equal in length to third; caudal fin rounded; vertebrae 11 + 17; epineurals 14; epurals 3.

Upper jaw with 2 pairs of curved, enlarged caniniform teeth anteriorly, and 5 (at symphysis) to 1-2 (on sides of jaw) irregular rows of small conical teeth, outermost of rows of teeth much larger and more curved than those of inner rows; lower jaw with 2 pairs of curved, enlarged caniniform teeth anteriorly, and about 3 (at symphysis) to 1 (on sides of jaw) inner rows of small conical to caniniform teeth, those on middle of jaw enlarged and caniniform; vomer with 1-2 rows of small conical teeth arranged in chevron; palatine with 1 row of small conical teeth, more-or-less contiguous anteriorly with posterolateral

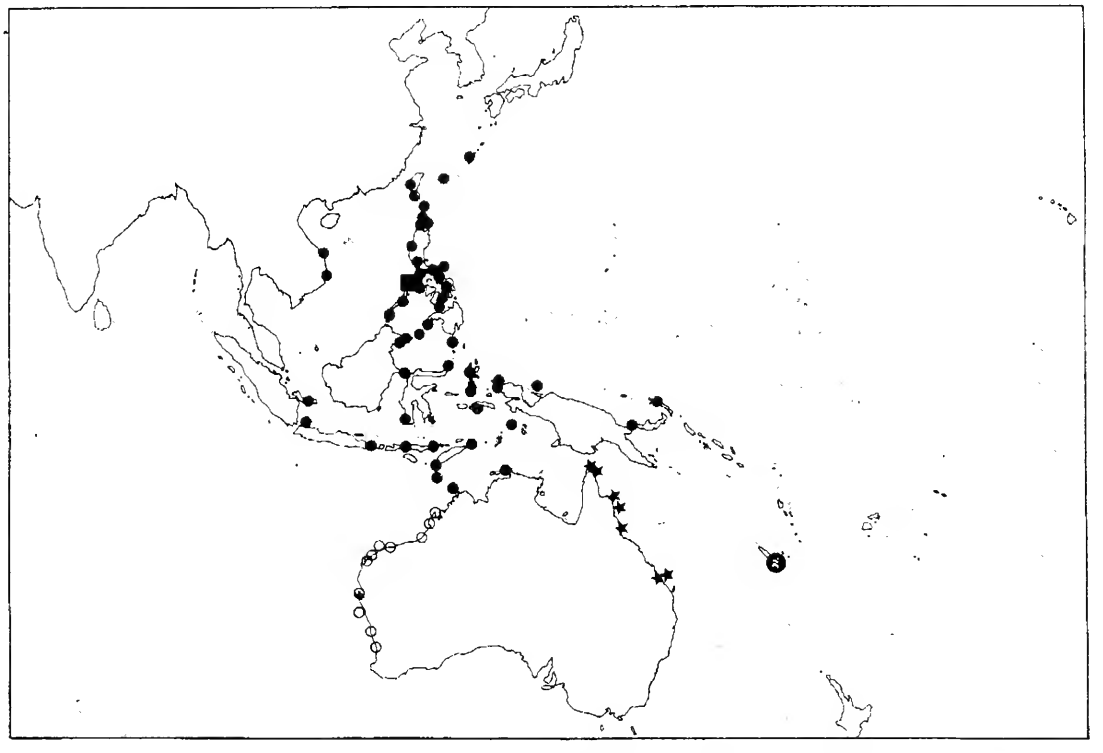

Figure 13. Distributional records for *Labracinus atrofasciatus* + *L. cyclophthalmus* (square), *L. cyclophthalmus* (closed circles), *L. lineatus* (open circles), *Ogilbyina queenslandiae* (stars) and *O. salvati* (inset star).

arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL: head length 25.8; orbit diameter 6.9; snout length 8.0; fleshy interorbital width 6.7; bony interorbital width 4.5; body width 13.8; snout tip to posterior tip of retroarticular bone 17.3; predorsal length 32.4; prepelvic length 36.5; posterior tip of retroarticular bone to pelvic-fin origin 21.5; dorsal-fin origin to pelvic-fin origin 36.4; dorsal-fin origin to middle dorsal-fin ray 38.7; dorsal-fin origin to anal-fin origin 52.2; pelvic-fin origin to anal-fin origin 26.7; middle dorsal-fin ray to dorsal-fin termination 29.5; middle dorsal-fin ray to anal-fin origin 35.2; anal-fin origin to dorsal-fin termination 42.0; anal-fin base length 32.5; dorsal-fin termination to anal-fin termination 17.3; dorsal-fin termination to caudal peduncle dorsal edge 8.7; dorsal-fin termination to caudal peduncle ventral edge 17.6; anal-fin termination to caudal peduncle dorsal edge 18.7; anal-fin termination to caudal peduncle ventral edge 9.7; first dorsal-fin spine 3.1; second dorsal-fin spine 5.3; first segmented dorsal-fin ray 13.2; fourth last segmented dorsal-fin ray 25.5; first anal-fin spine 3.2; second anal-fin spine 5.2; third anal-fin spine 6.5; first segmented anal-fin ray 12.3; fourth last segmented anal-fin ray 22.5; third pectoral-fin ray 17.9; pelvic-fin spine 10.6; second segmented pelvic-fin ray 24.9; caudal-fin length 28.6.

Live coloration: not known.

Preserved coloration: head and body brown, paler on ventral part of head and on caudal peduncle; dark grey curved mark extending around posterior rim of orbit to middle of upper lip, this becoming abruptly paler and indistinct beneath middle of orbit; scales of nape and dorsal part of body anterior to an oblique line extending from near pectoral-fin axis to below sixth segmented dorsal-fin ray each with dark brown basal spot; behind these an irregularly-spaced series of 12-14 narrow dark brown bars extending ventrally and posteriorly from anterior lateral line (anteriorly) or dorsal-fin base to ventral part of body, last of these from near base of last dorsal ray to near ventral edge of anterior third of caudal peduncle; anterior bars grouped in pairs, tending to become more evenly spaced posteriorly; dorsal fin brown, distally with several horizontal rows of small dark brown spots, these aligning behind third segmented ray to form series of broken lines that curve posteriorly and ventrally to base of each segmented ray; spots becoming larger and elongate on middle part of arc, basal-most spot largest and rounded; last broken curved line ending in large (subequal to pupil) rounded spot positioned near basal third of fin between segmented rays 21 and 24; distal few rows of spots forming broken horizontal lines on posterior third of fin; anal fin brown, darker than dorsal fin; caudal fin pale brown to hyaline; pectoral fins hyaline; pelvic fins brown, paler anteriorly.

HABITAT AND DISTRIBUTION: *Labracinus atrofasciatus* is known only on the basis of the holotype collected at Culion, Culion Id, Philippines (Figure 13). No information on habitat was included either in the original description or on the collection label for the specimen.

COMPARISONS: The identity of *Labracinus* species has been confused considerably in the past. The three species are readily recognisable on the basis of meristic and preopercular scalation characters. *Labracinus lineatus* differs from the other two species in having the dorsal portion of the preopercle naked rather than scaled (Figure 11), and in tending to have more scales in lateral series (61-74, usually 65 or more versus 52-68, usually 65 or fewer for *L. cyclophthalmus*, and 60 for *L. atrofasciatus*), more anterior lateral-line scales (53-67, usually 55 or more versus 43-62, usually 56 or fewer for *L. cyclophthalmus*, and 51-53 for *L atrofasciatus*), fewer scales between lateral lines (4-6, modally 4 versus 4-7, modally 5 for *L. cyclophthalmus*, and 7 for *L. atrofasciatus*), and fewer scales below the anterior lateral line (16-20, usually 19 or fewer versus 18-25, usually 19 or more for *L. cyclophthalmus*, and 24-25 for *L. atrofasciatus*). *Labracinus atrofasciatus* is readily distinguished in having more circumpeduncular scales (32 versus 24-30) and pseudobranch filaments (23-24 versus 12-20) than the other two species.

The three species also differ in several coloration details. *Labracinus atrofasciatus* is distinctive in having a series of narrow dark oblique bars on the posterior part of the body and a large dark spot on the posterior part of the dorsal fin. The dark cheek markings of *L. cyclophthalmus* are usually present as relatively distinct, straight-edged bars whereas in *L. lineatus* they are faint and more-or-less vermiform; dark cheek markings are not discernible on the holotype of *L. atrofasciatus*. The caudal fin of *L. lineatus* is distinctive in usually having a series of pale grey to pale brown (pale pink to pale orange or pale blue in life) stripes extending obliquely from the upper and lower margins towards the central and posterior parts of the fin.

The combination of small scale size (scales in lateral series 60; anterior lateral-line scales 51-53) and a dorsal-fin ray count of II,25 readily distinguishes *L. atrofasciatus* from members of other pseudochromine genera. Furthermore, the pseudobranch filament and circumpeduncular scale counts for *L. atrofasciatus* are higher than in any other pseudochromine species.

REMARKS: This species is one of two pseudochromines known only on the basis of holotypes from Culion; the other is *Pseudochromis colei*.

ETYMOLOGY: The specific epithet is derived from the Latin *atrum*, black, and *fascia*, band, with apparent reference to the dark bands and lines on the body and dorsal fin.

MATERIAL EXAMINED: PHILIPPINES: Calamian Group, Culion Id, Culion, CAS-SU 25518, 1(1), 105.5 mm SL (holotype).

***Labracinus cyclophthalmus* (Müller & Troschel)**

Red Dottyback

Figures 11A, 13; Plates 1H-J, 2A

Julis Horsfieldii Valenciennes *in* Cuvier & Valenciennes, 1839: 486 (type locality: Siam); Bauchot, 1963: 74 (list); Gill & Randall, 1999: 95, fig. 1 (reproduction of manuscript painting of holotype; discussion of nomenclature).

Cichlops cyclophthalmus Müller & Troschel, 1849: 24, pl. 4, fig. 1 (type locality: Sunda Ids); Günther, 1860: 259 (compilation); Bleeker, 1875: 8, pl. 2, fig. 2 (description; Celebes; synonymy with *C. japonicus* Gill); Bleeker, 1877:

pl. 390, fig. 8.

Cichlops melanotaenia Bleeker, 1852: 765 (type locality: Macassar, Celebes); Günther, 1860: 259 (compilation); Bleeker, 1875: 7, pl. 2, fig. 3 (description; distribution); Bleeker, 1877: pl. 390, fig. 5; Jordan & Richardson, 1908: 261 (Cuyo Id, Philippines).

Cichlops spilopterus Bleeker, 1853b: 168 (type locality: Macassar, Celebes); Günther, 1860: 259 (compilation); Bleeker, 1868: 299 (list; Waigiou); Bleeker, 1875: 11, pl. 1, fig. 4 (description; distribution); Bleeker, 1877: pl. 390, fig. 9.

Cichlops Hellmuthii Bleeker, 1854: 329 (type locality: Larantuka, Flores).

Cichlops trispilos Bleeker, 1855b: 110 (type locality: Sahu, Halmaheira).

Cichlopsis cichlophthalmus; Schlegel, 1858: 121 (description; Moluksche zee; putative incorrect spelling of *Cichlops cyclophthalmus* Müller & Troschel).

Cichlops japonicus Gill, 1859: 147 (type locality: Japan).

Julis horsfieldii; Günther, 1862b: 143 (list).

Cichlops Hellmuthi; Bleeker, 1868: 299 (list; Waigiou); Bleeker, 1875: 12, pl. 1, fig. 6 (description; distribution); Bleeker, 1877: pl. 390, fig. 4.

Cichlops melanotaenia var. *altera* Bleeker, 1875: 8 (type locality not stated).

Cichlops trispilus; Bleeker, 1875: 10, pl. 3, fig. 5 (description; distribution); Bleeker, 1877: pl. 390, fig. 2.

Cichlops spiloptera; Jordan & Richardson, 1908: 261 (description; Fuga and Calayan Ids, Philippines).

Dampieria cyclophthalma; Jordan et al., 1913: 188 (list); Schmidt, 1930: 125 (list); Aoyagi, 1941c: 50 (list); Lindberg & Krasyukova, 1971: 113, fig. 160 (compilation; Sado Id); Hayashi, 1984: 140, pl. 126, figs f and g (description; distribution); Masuda, 1984: 73 (Karama, Japan; colour fig.); Shao et al., 1994: 277 (list; Pescadores Ids).

Cichlops microphthalmus; Jordan, 1919a: 243 (misspelling for *C. cyclophthalmus*).

Dampieria melanotaenia; Fowler, 1927: 275 (description; Philippines); Weber & de Beaufort, 1931: 123 (description; distribution); Roxas & Martin, 1937: 124 (list); Aoyagi, 1941c: 51, fig. 4 (description; Riu Kiu Ids); Herre, 1953: 370 (list); Masuda et al., 1975: 226, fig. 53-m (description; distribution); Masuda, 1984: 73 (El Nido, Philippines; colour figs); Shao, 1994: 300, figs 77-3 and 77-4 (description; colour figs).

Dampieria hellmuthii; Fowler, 1928: 189 (compilation).

Dampieria spiloptera; Fowler, 1928: 189 (compilation); Roxas & Martin, 1937: 124 (list); Aoyagi, 1941c: 49 (description; Riu Kiu Ids); Herre, 1953: 370 (list); Munro, 1958: 169 (list); Masuda et al., 1975: 226, fig. 53-l (description; distribution).

Dampieria hellmuthi; Schmidt, 1930: 62, 125, pl. 4, fig. 3 (description; distribution; Daikuma, Amami-Oshima, Ryukyu Ids).

Dampieria (Dampieria) cyclophthalma; Fowler, 1931b: 5 (compilation).

Dampieria (Dampieria) spiloptera; Fowler, 1931b: 6 (description; distribution).

Dampieria (Dampieria) trispilos; Fowler, 1931b: 11 (description; distribution); Aoyagi, 1941c: 51 (list).

Dampieria (Dampieria) melanotaenia; Fowler, 1931b: 12, fig. 1 (description; distribution).

Dampieria (Dampieria) melanostigma Fowler, 1931b: 16, figs 2-3 (type locality: Langao Point, Luzon, Philippines); Aoyagi, 1941c: 52 (list); Böhlke, 1984: 148 (list).

Dampieria trispilus; Weber & de Beaufort, 1931: 124 (description; distribution); Roxas & Martin, 1937: 124 (list); Herre, 1953: 371 (list); Kailola, 1974: 78 (description; Siassi Ids, Papua New Guinea).

Dampieria cyclophthalmus; Weber & de Beaufort, 1931: 125 (description; distribution); Shao, 1994: 299, fig. 77-2 (description; colour fig.).

Dampieria spilopterus; Weber & de Beaufort, 1931: 126, fig. 22 (description; distribution).

Dampieria ocellifera Fowler, 1946: 130, fig. 4 (type locality: Aguni Shima, Riu Kiu Ids); Böhlke, 1984: 51 (list).

Plesiops nigricans [*non Pharopteryx nigricans* Rüppell, 1828]; Munro, 1955: pl. 21, fig. 318 (based on Bleeker [1875] fig. of *Cichlops melanotaenia*).

Labracinus melanotaenia; Schultz, 1967: 24, fig. 4 (description; distribution; sexual dimorphism; synonymy with *C. melanotaenia altera* Bleeker and *D. melanostigma* Fowler); Masuda & Allen, 1993: 136, fig. E (colour fig.); Shen, 1984: fig. 291-9a and b (Taiwan); Lieske & Myers, 1994: pl. 33, fig. 4 (colour fig.; habitat and distribution); Eichler & Myers, 1997: 120 (distribution; colour fig.).

Labracinus lineatus [*non Dampieria lineata* Castelnau, 1875]; Schultz, 1967: 30, fig. 5 (description; distribution in part [non-Western Australian localities only]; sexual dimorphism); Baensch & Debelius, 1992: 962 (colour fig.).

Labracinus cyclophthalmus; Schultz, 1967: 33, figs 3, 6 and 7 (description; distribution; sexual dimorphism; synonymy with *C. spilopterus* Bleeker, *C. helmuthii* Bleeker and *C. trispilos* Bleeker); Burgess & Axelrod, 1972: 156, figs 273-274 (colour figs; sexual dimorphism; Philippines and Okinawa); Axelrod & Burgess, 1973: 311 (colour fig.); Burgess & Axelrod, 1974: figs 260-262 (colour figs; sexual dimorphism; Taiwan); Mayland, 1975: 147, fig. 87 (aquarium maintenance); Schroeder, 1980: 159, figs 166-a and b (western Sulu Sea; sexual dimorphism); Shen, 1984: fig. 291-8b and c (Taiwan); Kailola, 1987: 243 (list, Papua New Guinea); Burgess et al., 1988: pl. 150 (colour fig.); Kuiter, 1992: 43, figs e and f (colour figs; habitat and distribution); Gill, 1993: 39 (colour figs; sexual dimorphism; habitat and distribution); Fosså & Nilsen, 1993: 129 (colour fig.; aquarium notes); Lieske & Myers, 1994: pl. 33, fig. 2 (colour fig.; habitat and distribution); Kuiter & Debelius, 1994: 115 (colour fig.; habitat and distribution); Gill, 1995: 243 (identification of primary types of *Cichlops melanotaenia*, *C. spilopterus*, *C. hellmuthii* and *C. trispilos*); Allen, 1997: 96, pl. 29-6 (description; distribution; col. fig.); Eichler & Myers, 1997: 120 (distribution; colour fig.); Steene, 1998: 165 (colour fig.; Tukang Besi, Indonesia); Gill & Randall, 1999: 95, figs 2-3 (discussion of nomenclature; colour figs); Gill, 1999b: 2571 (description; distribution; fig.).

Labracinus melanostigma; Rau & Rau, 1980: 486 (description; fig.; Philippines).

Labracinus spilopterus; Rau & Rau, 1980: 487 (description; fig.; Philippines).

Labracinus cyclophthalma; Masuda & Allen, 1993: 136, fig. D (colour fig.); Nakabo & Mochizuki, 1998: 108 (colour

fig.).

Ogilbyina cyclophthalma; Masuda & Kobayashi, 1994: 126, fig. 3 (colour fig.); Konishi, 1995: 233 (description; colour fig.).

DIAGNOSIS: *Labracinus cyclophthalmus* is distinguished from congeners in having the upper portion of the preopercle scaled in combination with 24-30 circumpeduncular scales.

DESCRIPTION (based on 97 specimens, 39.0-162.0 mm SL): dorsal-fin rays II,24-26, all or all but first 1-2 segmented rays branched; anal-fin rays III,14-15, all segmented rays branched; pectoral-fin rays 17-20; upper procurrent caudal-fin rays 5-6; lower procurrent caudal-fin rays 4-6; total caudal-fin rays 26-29; scales in lateral series 52-68; anterior lateral-line scales 43-62; anterior lateral line terminating beneath segmented dorsal-fin ray 17-23; posterior lateral-line scales 12-24 + 1-4; scales between lateral lines 4-7; horizontal scale rows above anal-fin origin 18-25 + 1 + 3-6 = 23-30; circumpeduncular scales 24-30; predorsal scales 29-42; scales behind eye 2-4; scales to preopercular angle 5-10; gill rakers 6-10 + 11-15 = 17-23; pseudobranch filaments 13-20.

Lower lip complete; dorsal and anal fins with well-developed scale sheaths; predorsal scales extending anteriorly to point ranging from vicinity of posterior AIO to anterior AIO pores; opercle with 0-7 small, indistinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed mainly on distal halves or tips of rakers only, although sometimes with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1/1/1/1/1/1/1/1/1/1 + 1*/1; dorsal-fin spines slender and weakly pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1/1/1/1/1 + 1*/1/1 + 1* or 3/1 + 1/1/1/1/1/1 + 1/1/1/1 + 1; anal-fin spines moderately stout to stout and pungent, second spine usually stouter than third; pelvic-fin spine slender, tip weakly pungent to flexible; second or third segmented pelvic-fin ray longest; caudal fin rounded; vertebrae 11 + 17; epineurals 13-14; epurals 3.

Upper jaw with 1-3 pairs of curved, enlarged caniniform teeth anteriorly, and 3-6 (at symphysis) to 1-3 (on sides of jaw) irregular rows of small conical teeth, outermost of rows of teeth much larger and more curved than those of inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth to caniniform teeth, those on middle of jaw enlarged and caniniform; vomer with 1-3 rows of small conical teeth arranged in chevron; palatine with 1-3 irregular rows of small conical teeth arranged in small to very small ovoid patch (often partially or completely obscured by thick fleshy tissue), anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 41 specimens, 39.0-157.5 mm SL): head length 20.6-28.7; orbit diameter 5.7-10.8; snout length 4.2-8.8; fleshy interorbital width 5.9-7.6; bony interorbital width 3.1-5.8; body width 12.0-15.8; snout tip to posterior tip of retroarticular bone 14.4-17.1; predorsal length 27.5-35.1; prepelvic length 31.2-40.4; posterior tip of retroarticular bone to pelvic-fin origin 15.2-27.1; dorsal-fin origin to pelvic-fin origin 31.0-37.8; dorsal-fin origin to middle dorsal-fin ray 32.6-43.2; dorsal-fin origin to anal-fin origin 44.1-52.8; pelvic-fin origin to anal-fin origin 24.4-35.2; middle dorsal-fin ray to dorsal-fin termination 22.0-31.3; middle dorsal-fin ray to anal-fin origin 27.7-35.9; anal-fin origin to dorsal-fin termination 35.7-43.6; anal-fin base length 28.0-40.0; dorsal-fin termination to anal-fin termination 14.7-18.5; dorsal-fin termination to caudal peduncle dorsal edge 6.4-9.7; dorsal-fin termination to caudal peduncle ventral edge 14.8-19.4; anal-fin termination to caudal peduncle dorsal edge 17.3-20.6; anal-fin termination to caudal peduncle ventral edge 7.9-12.7; first dorsal-fin spine 2.3-5.7; second dorsal-fin spine 4.3-7.3; first segmented dorsal-fin ray 10.4-15.4; fourth last segmented dorsal-fin ray 13.9-27.1; first anal-fin spine 1.6-3.7; second anal-fin spine 3.4-5.6; third anal-fin spine 5.0-8.4; first segmented anal-fin ray 8.8-14.1; fourth last segmented anal-fin ray 17.5-23.9; third pectoral-fin ray 13.4-19.5; pelvic-fin spine 8.3-12.8; second segmented pelvic-fin ray 20.4-26.0; caudal-fin length 24.5-32.0.

Live coloration (based on photographs of specimens from Japan, the Philippines, Indonesia and the North West Shelf of Australia and on captive specimens; Plates 1H-J, 2A): head and body varying from pale grey or olive to bright orange or bright red, usually becoming dark olive to black on dorsal part of head and nape and sometimes posteriorly on body behind anal-fin origin; midposterior orbital rim edged broadly with dark grey to black; opercular scales each with dusky reddish brown to blue or dark grey to black spot; cheeks with blue or green to dark grey bars along each oblique scale row; preorbital region usually with series of blue or green to dark grey stripes extending from eye to upper lip; upper and sometimes lower lip reddish grey to dark grey with series of pinkish grey to bright red spots and lines, these aligning with pale areas between dark lines of cheek and preorbit; iris pinkish grey to bright red with blue suboval ring around pupil; scales of dorsoanterior part of body each with bluish grey to dark blue or black spot, these sometimes continuing posteriorly on body to caudal-fin base; dark scale spots sometimes coalescing to form dark stripes along base of dorsal fin and/or along alternate scale rows on posterior part of body; upper part of body sometimes with series of white to bright yellow broad, slightly oblique bars extending from below dorsal-fin base to midside; pectoral-fin axil and upper part of pectoral-fin base usually pinkish grey to black; dorsal fin either brownish hyaline to dark grey or reddish brown to bright orange or bright red, usually with bright blue to dark grey distal margin and small dark reddish brown to dark grey or black spots on anterior part of fin that align to form stripes on posterior part of fin; spinous portion of fin sometimes with large dark grey to black spot; putative females usually with rows of spots on proximal part of fin curving posteroventrally and coalescing to form dark grey to black comma-shaped markings; putative males sometimes with one to several horizontally elongate dark grey to black blotches basally on midanterior part of fin; anal fin brownish or bluish hyaline to bright red or dark grey, usually with bright blue to dark grey distal margin and about three to 12 pale pink to pale orange or pale blue slightly oblique stripes; caudal fin bluish or greyish hyaline to bright red or black, usually with dusky grey to bright blue or black distal margin; pectoral fins bright yellow to pinkish hyaline or hyaline; pelvic fins pinkish or yellowish hyaline to bright yellow or bright red.

Preserved coloration: pattern similar to live coloration: head and body becoming pale brown to dark grey-brown, darker on dorsal contour of head and nape and sometimes on posterior part of body behind anal-fin origin; dark markings on head becoming brown to dark grey; pinkish grey to bright red spots and lines on lips becoming pale grey to pale brown; bluish grey to dark blue or black spots and lines on sides of body becoming brown or greyish brown to black; grey to black marking on pectoral-fin axil and upper pectoral-fin base remain, sometimes extending ventrally along pectoral-fin base to form dumbbell-shaped bar; white to bright yellow oblique bars on dorsal part of body becoming pale yellow to pale brown; dorsal fin becoming brownish hyaline to dark grey-brown; spots, blotches, stripes and other markings on dorsal fin becoming pale brown to dark grey or black; anal fin becoming brownish hyaline to dark grey brown; pale stripes on anal fin becoming pale grey to pale brown; caudal fin becoming hyaline or brownish hyaline to dark grey-brown, sometimes with a series of pale grey to pale brown oblique bars extending from upper and lower fin margins toward midposterior part of fin; pectoral fins becoming dusky hyaline to hyaline; pelvic fins becoming hyaline or dusky hyaline to pale brown, sometimes with anterior margin of fin grey.

HABITAT AND DISTRIBUTION: *Labracinus cyclophthalmus* is widely distributed throughout the Indo-Malaysian Archipelago, from southern Japan through the Philippine Ids and Indonesia south to the North West Shelf of Australia and east to New Ireland, Papua New Guinea (Figure 13). It has been collected around rock and coral reefs in a variety of habitats, including tidal pools, reef flats, surge channels and reef slopes, often in relatively silty areas, at depths ranging to 20 m.

COMPARISONS: Diagnostic features of thc three *Labracinus* species are discussed under *Comparisons* for *L. atrofasciatus*. The large number of scales in lateral series (52-68) in combination with a dorsal-fin ray count of II,24-26 (usually 25) readily separates *L. cyclophthalmus* from all other pseudochromines.

REMARKS: *Labracinus cyclophthalmus* is a large species; the largest specimen examined measured 162.0 mm SL. It exhibits a high degree of colour variation. At least some of this variation appears to be due to sexual dimorphism. Because of poor gonad preservation, it was possible to establish the sex of only a few of the specimens examined. Female specimens usually had the following characteristics: comma-shaped dark markings present on the middle and midposterior parts of the dorsal fin; abdominal region above the anal-fin origin usually with a large, markedly paler spot (bright orange to bright red in life), sometimes with the posterior part of the body behind this spot abruptly dark grey-brown; and caudal, anal and at least the posterior part of the dorsal fin relatively dark in coloration. Lange (1987a) noted that the bright red abdominal spot was usually displayed by females only when breeding or when excited. Published live-colour illustrations conforming to the preserved female colourations include Burgess & Axelrod (1974: fig. 260), Schroeder (1980: fig. 166-b), Shen (1984: figs 291-9a and 9b), Hayashi (1984: pl. 126, fig. f), Gill (1993: 39, lower fig.), Shao (1994: figs 77-2 and 3), Konishi (1995) and Gill & Randall (1999: fig. 2). Preserved male specimens usually had the following characteristics: dorsal fin relatively pale without dark comma-shaped markings, although sometimes with one or more large, dark grey to black horizontally elongate blotches on the basal part of the fin; anal and caudal fins relatively pale; and the posterior part of the body not noticeably darker than the abdominal area above the anal-fin origin. Published live-colour illustrations conforming to the preserved male colourations include Burgess & Axelrod (1974: figs 261 and 262), Schroeder (1980: fig. 166a), Shen (1984: figs 291-8b and 8c), Hayashi (1984: pl. 126, fig. g), Lange (1987a: fig. 2), Gill (1993: 34) and Shao (1994: fig. 77-4). Although these observations of putative sexual dimorphism are based on relatively few specimens, it is noteworthy that other authors (e.g., Schultz, 1967, Schroeder, 1980, Hayashi, 1984, and Lange, 1987a) have reached similar conclusions.

A relatively large number of specimens were examined in this study that had colourations intermediate between those of the two sexes; this may indicate that the species is hermaphroditic. Unfortunately the gonads in all of these specimens were too badly disintegrated to allow sexing. However, a 120.0 mm SL specimen (BPBM 23351) with typical male coloration was examined that had well-developed testes sheathed ventrally by ovarian tissue.

Considering the colour variation shown by this species, it is not surprising that it has been described under several names. In the most recent revision of *Labracinus*, Schultz (1967) recognised *L. melanotaenia*, *L. lineatus* (*non* Castelnau) and *L. cyclophthalmus* as valid species based on coloration. Under *L. melanotaenia* he included specimens with dark stripes on alternate horizontal scale rows behind the pectoral-fin base or with a single, or broken series of stripes along the dorsal-fin base and with a prominent black spot on the dorsal edge of the pectoral-fin base. Under *L. lineatus* he included specimens with prominent pale spots on the upper jaws and lips, dark spots (if present) arranged along each horizontal scale row, and without a prominent black spot on the pectoral-fin base. Under *L. cyclophthalmus* he included specimens with neither dark lines on the body, a prominent black spot on the pectoral base, nor pale spots on the upper jaws or lips.

There are several reasons for attributing Schultz's putative species to intraspecific variation. Firstly, many specimens examined in the present study did not conform clearly in coloration to one or other of Schultz's species. These included the holotypes of several nominal species and most of the material identified as *L. cyclophthalmus* by Schultz. Dark body striping, for example, showed considerable variation (see Fowler, 1931b: figs 1 and 3) and when present was not always associated with the other characters used by Schultz to diagnose *L. melanotaenia*. It is also noteworthy that similar variation in dark body striping also occurs in *L. lineatus*. Secondly, the colour forms are not geographically associated; the various forms have similar geographical distributions and a number of collections contained two or more of the colour forms (in some cases including intermediately coloured specimens) from the same field station. Thirdly and finally, my attempts (including multivariate statistical analyses of meristic and morphometric characters) at identifying other morphological traits that correlated with the colour forms were

unsuccessful.

Labracinus cyclophthalmus has been bred in captivity (Lange, 1987a, b; see *Biology* section for further discussion). It is thus possible to use breeding experiments to test the above hypothesis of a single variable species.

Bleeker described five nominal species of *Cichlops* (*Labracinus*). As he had a habit of adding subsequent material to the same jar as his type specimens, identification of his types is often problematical. Justifications for the identification of primary types for four of the nominal species (*Cichlops melanotaenia*, *C. trispilos*, *C. hellmuthii* and *C. spilopterus*) are given in Gill (1995). However, one nominal species was overlooked in that account: *Cichlops melanotaenia altera*. Bleeker (1875) very briefly described this form at the end of his description of *C. melanotaenia*, without indicating type specimens or their provenance. I was unable to locate any specimens labelled or otherwise indicated as the type(s) of *altera*, nor were Eschmeyer et al. (1998) in their catalogue of Recent fish species. However, it is almost certain that the type(s) of *altera* is (are) among Bleeker's seven *C. melanotaenia* specimens reported in Gill (1995); all of these specimens are referable to the present species.

Valenciennes (in Cuvier & Valenciennes, 1839) described *Julis horsfieldii* as a new labrid based on a painting of a specimen from Thailand. This specific name has never been associated with any known labrid, but was recently identified by Gill & Randall (1997; 1999) as the present species, and, therefore, a disused senior synonym of Müller & Troschel's *Cichlops cyclophthalmus*. Because *horsfieldii* has not been used since it was first proposed, J.E. Randall and I notified the International Commission on Zoological Nomenclature Secretariat of the case, with the recommendation for continued use of *cyclophthalmus* in order to maintain stability (Gill & Randall, 1997). Under Article 23.9 of the new Code (International Commission on Zoological Nomenclature, 1999), which came into effect on 1 January 2000, commonly used junior synonyms permanently take precedence over senior synonyms that have not been used after 1899 without the need for ruling from the Commission; a statement to this effect regarding *horsfieldii* and *cyclophthalmus* was published by the International Commission on Zoological Nomenclature (2000: 8) and the case (Case 3060) is now considered closed.

ETYMOLOGY: The specific name *cyclophthalmus* is from the Greek *kyklos*, circle, and *ophthalmos*, eye, and apparently alludes to the dark curved marking around the midposterior rim of the orbit.

MATERIAL EXAMINED: JAPAN: "Ousima", USNM 6896, 1(1), 85.4 mm SL (holotype of *C. japonicus* Gill); Ryukyu Ids, Okinawa, W side of Sesoko Id, BPBM 22292, 5(5), 42.0-80.5 mm SL; Ryukyu Ids, W side of Okinawa, BPBM 19107, 2(0), 40.0-66.0 mm SL; Ryukyu Ids, Agunijima (Aguni Shima), ANSP 72005, 1(1), 92.1 mm SL (holotype of *D. ocellifera* Fowler), ANSP 72006-7, 2(2), 74.7 mm SL (paratypes of *D. ocellifera* Fowler); Ryukyu Is, Okinawa, Naha, CAS-SU 21152, 6(0), 55.2-115.9 mm SL, USNM 71977, 11(0); Ryukyu Ids, Ishigaki, BPBM 8700, 3(0), 72.0-110.0 mm SL, BPBM 8740, 5(0), 83.0-149.0 mm SL. TAIWAN: Peng-Hou, NTUM 1406, 1(1), 120.4 mm SL; Truan-Fan-Shih, BPBM 23351, 6(4, 45.7-120.0 mm SL), 36.5-120.0 mm SL, USNM 290849, 1(0), USNM 290855, 1(0), 153.3 mm SL, USNM 290897, 5(0), USNM 290898, 2(0); Ma-Kong, NTUM 6112, 1(1), 80.6 mm SL; Wan-Li-Tung, NTUM 6188, 1(1), 50.3 mm SL; Ta-Fan-Lieh, USNM 278132, 1(0); Sha-Tao, USNM 290468, 4(0). VIETNAM: Da Nang, MNHN A.2416, 2(2), 118.5-135.0 mm SL; Nha Trang vicinity, CAS 60978, 1(0), 104.2 mm SL. PHILIPPINE IDS: MNHN 1985-328, 1(1), 134.1 mm SL; Batan Id, White Beach, USNM 291607, 2(2), 77.0-81.3 mm SL, USNM 291608, 2(0); Batan Id, Baluarte Bay, USNM 291619, 2(2), 87.2-103.3 mm SL; Cabayan Id, CAS-SU 20366, 1(0), 115.0mm; Camiguin Id, Port San Pio Quinto, USNM 136965, 1(0); Fuga Id, USNM 72162, 1(0); Luzon, 3 km N of Santiago Id, LACM 42467-27, 4(4), 39.0-87.2 mm SL (84.7 mm SL specimen subsequently cleared and stained); Luzon, Lingayen Gulf, off Panacalan Ids, LACM 42463-19, 3(3), 95.3-104.5 mm SL (95.3 mm SL specimen subsequently cleared and stained); Luzon, Lingayen Gulf, off Cangaluyan Ids, LACM 37434-3, 2(0), 114.0-115.5 mm SL; Luzon, Lingayen Gulf, Hundred Ids, Coral Garden Id, LACM 37414-8, 2(0), 105.0-117.0 mm SL; Luzon, Subic Bay, Grande Id reef, USNM 146443, 1(0); Luzon, Manila, AMS I.16522-002, 1(1), 119.8 mm SL; Luzon, Langao Point, USNM 89989, 1(1), 118.5 mm SL (holotype of *D. melanostigma* Fowler), USNM 199646, 2(2), 70.5-107.2 mm SL; Luzon, Ragay Gulf, Alibijaban Id, USNM 146439, 1(0); Luzon, Rapurapu Id, USNM 145350, 1(0); Luzon, Gubat Bay, USNM 136980, 1(0), USNM 143580, 2(0); Burias Id, Alimango Bay, USNM 136941, 1(0), Quinalasag Id, Masamat Bay, USNM 169407, 1(0); Mindoro, Galera Bay, USNM 199643, 1(1), 118.2 mm SL; Mindoro Strait, Tara Id, USNM 136970, 1(0); Calamian Group, Busuanga Id, Port Caltom, USNM 136934, 1(0); Cuyo Ids, NNE side of Bararin Id, USNM 290852, 2(2), 99.5-162.0 mm SL); Cuyo Is, Cuyo Id, USNM 290204, 1(0); Cuyo Ids, Tagauayan Id, USNM 290501, 4(0); Palawan, Makesi Id, USNM 136946, 2(2), 133.2-140.6 mm SL; Palawan, Sombrero Id, LACM 42488-10, 2(2), 108.9-132.3 mm SL; Balabac Id, Candaraman Id, USNM 169442, 1(0); Balabac Id, Caxigan Id, USNM 169444, 1(0); Cagayan Sulu Id, USNM 146444, 2(0), 91.0-109.6 mm SL; Samar Sea, Talajit Id, Buang Bay, ANSP 101791, 1(1), 148.3 mm SL, USNM 199645, 2(2), 147.2-157.5 mm SL; Cebu Id, Cebu, ANSP 101790, 1(1), 136.7 mm SL (paratype of *D. melanostigma* Fowler), CAS-SU 28517, 1(0), 150.0 mm SL, CAS-SU 28518, 1(0), 62.9 mm SL, CAS-SU 29767, 6(0); Negros, Dumaguete, CAS 49557, 3(0), 64.2-123.7 mm SL, CAS 49559, 5(0), 43.8-113.1 mm SL, CAS 51966, 1(1), 70.6 mm SL; CAS-SU 28516, 1(0), 105.8 mm SL, CAS-SU 28521, 2(2), 56.5-72.8 mm SL; Siquijor Id, near Tonga Point, USNM 273822, 1(0); Mindanao, Zamboanga, Little Santa Cruz Id, USNM 199648, 1(1), 101.0 mm SL; Basilan Id, Isabella River, USNM 136940, 3(0); Sulu Archipelago, Jolo Id, Jolo, CAS-SU, 28520, 5(5), 62.0-110.5 mm SL; Singaan Id, USNM 199649, 1(1), 93.7 mm SL; Sulu Archipelago, Sitankai, CAS-SU 28519, 6(6), 52.8-114.0 mm SL, CAS-SU 32953, 4(0), 55.4-117.4 mm SL, CAS-SU 32954, 8(0), 60.7-124.2 mm SL. SABAH, MALAYSIA: Darvel Bay, Bum Bum Id, USNM 136933, 2(0). INDONESIA: BMNH 1880.4.21.138, 1(1), 150.5 mm SL (putative non-type Bleeker specimen of *C. spilopterus*); BMNH 1880.4.21. 139, 1(1), 140.0 mm SL (putative non-type Bleeker specimen of *C. melanotaenia*), RMNH 5964, 1(1), 100.7 mm SL (putative non-type Bleeker specimen of *C. trispilos*), RMNH 31183, 1(1), 90.1 mm SL (putative non-type Bleeker speeimen of *C. hellmuthii*), RMNH 31184, 3(0), 96.7-116.2 mm SL (putative

non-type Bleeker specimens of *C. trispilos*), RMNH 31185, 5(0), 60.3-144.3 mm SL (putative non-type Bleeker specimens of *C. spilopterus*), RMNH 31187, 3(0), 149.0-163.0 mm SL (putative non-type Bleeker specimens of *C. melanotaenia*); Kepulauan Kawio, off Kawio Id, ZMA 120.061, 1(1), 90.6 mm SL; Makassar Strait, Kupasang Id, USNM 136974, 1(0); Sulawesi (Celebes), ZMB 31723, 1(1), 141.0 mm SL (syntype of *C. cyclophthalmus* Müller & Troschel); Sulawesi, Talisei Id, USNM 13673, 1(0), USNM 136977, 1(0); Sulawesi (Celebes), Manado, RMNH 5965, 1(1), 98.9 mm SL; Sulawesi, Ujung Pandang (Macassar), RMNH 5966, 1(1), 127.3 mm SL (holotype of *C. spilopterus* Bleeker), RMNH 5967, 1(1), 138.0 mm SL (holotype of *C. melanotaenia* Bleeker); Sulawesi, Cape Kait, USNM 136976, 1(1), 78.0 mm SL; Moratai, USNM 147693, 1(0); Halmahera (Halmaheira), RMNH 5025, 1(1), 108.0 mm SL, RMNH 5026, 1(1), 86.3 mm SL; Halmahera, Sahu, MNHN A.8849, 1(1), 105.8 mm SL (holotype of *C. trispilos* Bleeker); Seram, Marsegoe Bay, AMS I.18469-041, 2(2), 48.7-71.5 mm SL; Saparua, off Kampunmahu, USNM 210101, 1(1), 87.0 mm SL; Great Kei Id, off Feer, ZMA 120.062, 1(1), 88.2 mm SL; Waigeo, CAS-SU 26702, 1(0), 39.2 mm SL; Irian Jaya, Batanta Ids, Hawaii Id, USNM 246244, 4(4), 54.6-107.7 mm SL; Irian Jaya, Biak Id, near Kampong Warsa, ZMA 120.064, 1(1), 119.0 mm SL; Sumatera, Gasper Strait, USNM 9414, 1(1), 143.5 mm SL; Pulau Seribu, Pulau Ajer, USNM 290906, 1(0); Bali, ANSP 15781, 8(0), ANSP 16975, 1(0), USNM 119228, 2(2), 62.5-87.8 mm SL; Bali, Sanur Beach, NTM S.11127-050, 1(1), 72.4 mm SL; Flores, Larantuka, RMNH 5999, 1(1), 91.6 mm SL (holotype of *C. hellmuthii* Bleeker); Roti Id, Papela Bay, ZMA 120.063, 1(1), 94.7 mm SL. AUSTRALIA: Timor Sea, Ashmore Reef, NTM S.11973-074, 1(1), 57.3 mm SL, WAM P.29048-018, 1(1), 110.9 mm SL; Timor Sea, Ashmore Reef, West Id, WAM P.29040-001, 2(2), 124.0-124.4 mm SL; Timor Sea, Ashmore Reef, West Pass, WAM P.29053-011, 1(1), 60.2 mm SL; Timor Sea, Ashmore Reef, SE corner, WAM P.30842-005, 1(1), 81.8 mm SL; Northern Territory, Coburg Peninsula, Sandy Id Number 2, NTM S.10038-008, 1(0), 14.2 mm SL; Western Australia, W side of Cassini Id, WAM P.30847-003, 1(1), 119.0 mm SL. PAPUA NEW GUINEA: New Ireland, N of Kavieng, USNM 290543, 1(1), 94.3 mm SL.

***Labracinus lineatus* (Castelnau)**
Lined Dottyback
Figures 11B, 13; Plates 2B-C

Dampieria lineata Castelnau, 1875: 30 (type locality: Dampier Archipelago, Australia); McCulloch, 1929: 159 (list; in part, Western Australia record only); Whitley, 1948: 18 (list; Western Australia); Scott, 1959: 74 (Point Samson, Western Australia); Mees, 1960: 13 (Point Quobba, Western Australia; synonymy with *D. ignita* Scott); Whitley, 1964a: 42 (list); Bauchot & Desoutter, 1986: 8 (list); Shao, 1994: fig. 208 (colour fig.; not from Taiwan, reproduction of Allen & Steene, 1987: pl. 32, fig. 5, Houtman Abrolhos, Western Australia).

Cichlops lineatus; Macleay, 1881: 571 (compilation); Waite, 1902: 191, pl. 31 (Mandurah, Western Australia); Waite, 1905: 63 (Houtman Abrolhos, Western Australia); Rendahl, 1921: 11 (description; Cape Jaubert).

Dampieria ignita Scott, 1959: 75, fig. 1 (type locality: Shark Bay, Western Australia).

Labracinus lineatus; Allen, 1985: 2508, figs 145-146 (list, Western Australia); Hutchins & Swainston, 1986: 52, 128, fig. 239 (in part, Western Australian distribution only); Allen & Steene, 1987: pl. 32, fig. 5 (Houtman Abrolhos, Western Australia); Burgess et al., 1988: pl. 155 (colour fig.); Allen & Swainston, 1988: 60, pl. 21, fig. 333 (in part, Western Australian distribution only); Paxton et al., 1989: 518 (list; distribution); Black et al., 1990: 255 (list, Shark Bay, Western Australia); Hutchins, 1990: 269 (list, Shark Bay, Western Australia); Burgess et al., 1991: 207 (colour fig.); Baensch & Debelius, 1992: 964 (colour fig.; habitat and distribution; aquarium notes); Gill, 1993: 30 (colour fig.; distribution); Lieske & Myers, 1994: pl. 33, fig. 3 (colour fig.; habitat and distribution); Allen, 1997: 94, pl. 28-10 (description; distribution; col. fig.).

DIAGNOSIS: *Labracinus lineatus* is separated from congeners in lacking scales on the upper part of the preopercle, and in having a relatively high number of scales in lateral series (61-74, usually more than 65) and in the anterior lateral line (53-67, usually more than 55) and a relatively low number of scale rows below the anterior lateral line (16-20, usually 17-19).

DESCRIPTION (based on 43 specimens, 28.5-174.0 mm SL): dorsal-fin rays II,24-25, last 6-25 segmented rays branched (all or all but first 1-2 branched in specimens larger than about 50 mm SL); anal-fin rays III,13-15, last 3-15 segmented rays branched (all or all but first branched in specimens larger than about 50 mm SL); pectoral-fin rays 17-20; upper procurrent caudal-fin rays 5-6; lower procurrent caudal-fin rays 5-6; total caudal-fin rays 27-29; scales in lateral series 61-74; anterior lateral-line scales 53-67; anterior lateral line terminating beneath segmented dorsal-fin ray 19-24; posterior lateral-line scales 11-29 + 1-3; scales between lateral lines 4-6; horizontal scale rows above anal-fin origin 16-20 + 1 + 3-5 = 21-26; circumpeduncular scales 26-30; predorsal scales 29-45; scales behind eye 3-5; scales to preopercular angle 6-12; gill rakers 5-8 + 11-13 = 16-20; pseudobranch filaments 12-20.

Lower lip complete; dorsal and anal fins with well-developed scale sheaths; predorsal scales extending anteriorly to point ranging from vicinity of mid AIO pores to anterior AIO pores; opercle with 1-5 small, inconspicuous serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or with well-developed teeth confined to raker tips, although sometimes with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1 + 1*/1/1 + 1*; dorsal-fin spines slender, tips weakly pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1/1/1/1 + 1*/1/1; anal-fin spines moderately stout to stout and pungent, second spine stouter than third; pelvic-fin spine slender, tip weakly pungent or flexible; second or third segmented pelvic-fin ray longest; caudal fin rounded; vertebrae 11 + 16-17; epineurals 13-15; epurals 3.

Upper jaw with 1-3 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1-3 (on sides of jaw) irregular rows of small conical teeth, outermost of rows of teeth much larger and more curved than those of inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 2-3 (at symphysis) to 1 (on sides of jaw) inner

rows of small conical teeth to caniniform teeth, those on middle of jaw enlarged and caniniform; vomer with 1-3 rows of small conical teeth arranged in chevron; palatine with 1-3 irregular rows of small conical teeth arranged in small to very small ovoid patch (often partially or completely obscured by thick fleshy tissue), anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 21 specimens, 31.7-174.0 mm SL): head length 21.4-28.7; orbit diameter 5.7-10.7; snout length 6.5-9.5; fleshy interorbital width 5.3-7.1; bony interorbital width 3.3-4.5; body width 11.7-14.4; snout tip to posterior tip of retroarticular bone 14.0-17.5; predorsal length 28.5-35.0; prepelvic length 31.8-37.1; posterior tip of retroarticular bone to pelvic-fin origin 17.9-23.3; dorsal-fin origin to pelvic-fin origin 28.2-33.4; dorsal-fin origin to middle dorsal-fin ray 31.1-39.9; dorsal-fin origin to anal-fin origin 41.4-46.2; pelvic-fin origin to anal-fin origin 25.8-35.1; middle dorsal-fin ray to dorsal-fin termination 26.3-32.0; middle dorsal-fin ray to anal-fin origin 27.1-31.8; anal-fin origin to dorsal-fin termination 35.3-42.7; anal-fin base length 27.8-33.3; dorsal-fin termination to anal-fin termination 15.4-17.3; dorsal-fin termination to caudal peduncle dorsal edge 7.3-9.5; dorsal-fin termination to caudal peduncle ventral edge 16.7-18.5; anal-fin termination to caudal peduncle dorsal edge 17.7-20.5; anal-fin termination to caudal peduncle ventral edge 9.1-11.2; first dorsal-fin spine 3.4-6.1; second dorsal-fin spine 5.0-9.2; first segmented dorsal-fin ray 10.5-15.5; fourth last segmented dorsal-fin ray 23.3-30.8; first anal-fin spine 1.9-3.9; second anal-fin spine 3.8-6.7; third anal-fin spine 4.9-7.4; first segmented anal-fin ray 10.0-13.3; fourth last segmented anal-fin ray 18.4-26.6; third pectoral-fin ray 14.5-16.8; pelvic-fin spine 7.5-12.8; second segmented pelvic-fin ray 19.0-22.3; caudal-fin length 27.2-32.4.

Live coloration (based on photographs of specimens from Port Denison, the Abrolhos Ids, Muiron Ids, West Pilbara Ids and Shark Bay, Western Australia, and on field observations at the West Pilbara Ids; Plates 2B-C): head olive-grey to pinkish brown or orange, olive dorsally, with pale blue to bright blue irregular spots and lines on cheeks, operculum, snout and lips; vertical dark grey bar behind midposterior part of eye, this edged posteriorly with blue line, blue line curving anteroventrally to edge of upper lip; iris pale orange to bright orange-red with blue suboval ring around pupil; body pale olive to pale pink or white, darker on dorsal contour; scales of body each with pinkish brown, olive or dark blue to black spot, these forming indistinct to distinct stripes along each horizontal scale row; abdominal area of some specimens (putative females) with large pale pink to reddish orange blotch, remainder of body mostly olive; dorsal fin bluish hyaline to bright yellow, dark olive or dark blue with five to 10 pale blue, pink or yellow to pale orange stripes; stripes becoming oblique and broken into spots and ocelli on anterior and sometimes basal part of fin; spinous portion of dorsal fin with large dark blue or dark grey to black spot; anal fin bluish hyaline to bright yellow, dark olive or dark blue with three to 12 pale pink to pale orange or pale blue slightly oblique bars; caudal fin bluish hyaline to bright yellow, dark olive or dark blue, usually with series of pale pink to pale orange or pale blue stripes, these extending obliquely from upper and lower margins towards central and posterior parts of fin; pectoral fins brownish or pinkish hyaline to hyaline; pelvic fins pale pink or pale blue to hyaline, usually with rows of small pale pink to bright red spots on inner rays.

Preserved coloration: pattern similar to live coloration, head and body becoming pale brown, darker dorsally, usually with brown to dark grey or black spots forming lines on sides of body; stripes usually present on each horizontal scale row on anterior part of body, but often present on alternate scale rows or absent on posterior part of body; putative females with large pale pinkish to yellowish brown area on posterior part of abdomen; dark grey to black mark behind eye remains; blue markings on head remain, becoming pale grey to brown; dorsal, anal and caudal fins becoming brownish hyaline to dark brown, pale stripes becoming pale grey to pale brown; dark spot on spinous portion of dorsal fin remains, becoming dark brown to black; pectoral fins becoming brownish hyaline to hyaline; pelvic fins becoming pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Labracinus lineatus* is endemic to Western Australia, from Riddell Point south to at least Jurien Bay (Figure 13). Records of this species from eastern Australia (e.g., Whitley, 1928; Russell, 1983) have been based on misidentified specimens of *Pseudochromis fuscus*. Schultz's (1967) account and distribution for *L. lineatus* was based on misidentified *L. cyclophthalmus*. In addition, records of *L. lineatus* from southern Western Australia (e.g., Waite, 1902) are dubious. Two specimens (AMS I.14811 and CAS-SU 31903) were examined from southern Western Australian localities [Mandurah, and "New Castle Bay" (Perth), respectively]; the first of these formed the basis of Waite's (1902) record of the species from Mandurah. Both specimens were gifts from the Western Australian Museum. The collection data accompanying the two specimens are probably erroneous. In support of this interpretation, Allen (1978: 376) commented on a specimen of another tropical species, the archerfish *Toxotes oligolepis*, that was labelled as having been collected from Mandurah; like the *L. lineatus* specimens, it had been sent as a gift from the Western Australian Museum (to the Australian Museum). Allen argued that the collection data for the specimen were erroneous. *Labracinus lineatus* has been collected and observed (pers. obs.) from tidal pools and rock and coral reefs, often in silty areas in harbours and near mangroves, at depths ranging to 15 m.

COMPARISONS: Diagnostic features separating the three *Labracinus* species are discussed under *Comparisons* for *L. atrofasciatus*. The small scale size (scales in lateral series 61-74; anterior lateral-line scales 53-67) in combination with a dorsal-fin ray count of II,24-25 distinguishes *L. lineatus* from all other pseudochromids.

REMARKS: *Labracinus lineatus* is the largest known pseudochromine species; the largest specimen examined measured 174.0 mm SL. Live colour illustrations of this species are provided in Allen (1985), Allen & Steene (1987), Burgess et al. (1988; 1991) and Gill (1993). Although it was possible to determine sex for only a few specimens, all of the females had a large pale blotch on the posterior part of the abdomen. Similar female coloration occurs among pseudochromines in at least

L. cyclophthalmus, *Cypho* species and some *Ogilbyina* species. *Labracinus lineatus* possibly also exhibits ontogenetic variation in coloration. A small (ca. 40 mm SL) individual observed by me at Boodie Id (just S of Barrow Id, Western Australia) was mostly pale pink to white, without dark lines on the body, and with the upper part of the head and predorsal contour bright yellow. Unfortunately, efforts to collect the individual were unsuccessful, and it is possible that it represented a different species. However, typically coloured larger individuals of *L. lineatus* were observed at the same site.

Scott's (1959) holotype of *D. ignita* is lost (Glover, 1976; pers. comm. 1985). There is little doubt, however, that Mees (1960) was correct in assigning it to junior synonymy with *L. lineatus*. Scott's description matches the putative female coloration noted above.

ETYMOLOGY: The specific epithet is from the Latin for lined, and refers to the longitudinal dark body stripes on the holotype.

MATERIAL EXAMINED: WESTERN AUSTRALIA: Riddell Point, WAM P.28059-002, 1(1), 123.0 mm SL; Broome, Gantheaume Point, WAM P.27274-034, 4(4), 97.2-128.0 mm SL, WAM P.28416-003, 1(1), 127.1 mm SL; Cape Bossut, ANSP 31452, 9(0); Dampier Archipelago, MNHN B.2361, 1(1), 152.0 mm SL (dried half-skin; holotype of *D. lineata* Castelnau); Dampier Archipelago, Rosemary Id, AMS I.19688-017, 1(1), 113.5 mm SL, NTM S.10814-026, 1(1), 140.4 mm SL, WAM P.20210, 1(1), 119.0 mm SL; Dampier Archipelago, Kendrew Id, BPBM 17411, 2(0), 95.0-100.0 mm SL; Port Hedland, AMS I.12945, 1(1), 135.5 mm SL; West Pilbara Ids, N side of Thevenard Id, 21°26'43"S 114°59'32"E, MPM 32608, 1(1), 106.5 mm SL; West Pilbara Ids, S side of Thevenard Id, 21°28'24"S 114°58'51"E, BMNH 2000.5.17.2, 1(1), 119.8 mm SL; West Pilbara Ids, SE side of Serrurier Id, 21°37'51"S 114°41'25"E, BMNH 2000.5.17.1, 1(1), 142.7 mm SL; Onslow, AMS IB.1578, 1(1), 145.0 mm SL; Exmouth Gulf, Bundegi Reef, AMS I.17060-048, 10(10), 28.5-45.7 mm SL, AMS I.17060-061, 2(2), 42.0 and 44.2 mm SL (cleared and stained); Exmouth Gulf, Burnside Id, BMNH 2000.5.17.3-4, 2(2), 69.0-77.5 mm SL, MPM 32609, 3(3), 66.0-75.8 mm SL; Shark Bay, RMNH 23920, 1(0), 125.2 mm SL; Shark Bay, 25°55'S 113°32'E, AMS I.25495-014, 1(1), 114.1 mm SL; Shark Bay, NW of Denham, WAM P.25532-004, 1(1), 58.4 mm SL; Shark Bay, Denham, WAM P.7641, 1(1), 32.0 mm SL; Shark Bay, South Passage, N of Monkey Rock, WAM P.26662-015, 1(1), 41.6 mm SL; Shark Bay, Sunday Id, WAM P.26668-002, 3(3), 34.6-91.4 mm SL; Houtman Abrolhos, AMS I.17025, 1(1), 144.1 mm SL; Houtman Abrolhos, W side of Long Id, WAM P.27853-007, 1(1), 112.9 mm SL; Houtman Abrolhos, South Group, WAM P.2610, 160.5 mm SL; Jurien Bay, WAM P.25171-001, 1(1), 135 mm SL; Jurien Bay, N end of Osprey Islet lagoon, WAM P.27951-012, 1(1), 86.0 mm SL; Perth, "New Castle Bay," CAS-SU 31903, 1(0), 128.0 mm SL; Mandurah, AMS I.4811, 1(1), 174.0 mm SL.

MANONICHTHYS gen. nov.

TYPE SPECIES: *Pseudochromis splendens* Fowler

DIAGNOSIS: *Manonichthys* differs from other pseudochromid genera in having in combination an incomplete lower lip and an anterior dorsal-fin pterygiophore formula of S*/S/S + 3 + 1*/1 + 1* (usually with four pterygiophores inserting anterior to neural spine 4).

REMARKS: *Manonichthys* includes three species that were previously assigned to *Pseudochromis* and two new species from the Philippines and Borneo. It was referred to as 'new genus A' by Gill, Leis & Rennis (2000). The genus differs from other pseudochromid genera in having an incomplete lower lip in combination with an anterior dorsal-fin pterygiophore formula of S*/S/S + 3 + 1*/1 + 1*, with three or four (usually four) pterygiophores inserting anterior to the fourth neural spine. External characteristics of the genus are within the range of variation exhibited by *Pseudochromis* species. However, the genus may be readily distinguished externally by the presence of ctenoid cheek and/or opercular scales in five of the species (*M. alleni*, *M. splendens*, *M. polynemus* and *M. winterbottomi*) and black pectoral fins in two species (*M. paranox* and *M. winterbottomi*). Ctenoid opercular and/or cheek scales are otherwise found only in *Assiculus punctatus* and *Assiculoides desmonotus*. The former species is readily distinguished from *Manonichthys* in having a complete lower lip and only 22-24 segmented dorsal-fin rays, whereas the latter is readily distinguished in having a complete lower lip, a very short caudal peduncle (anal-fin termination to caudal peduncle ventral edge 5.2-7.9 % SL versus 8.9-14.9 % SL in *Manonichthys*) and the posteriormost dorsal-fin ray bound to the dorsal edge of the caudal peduncle by membrane. Black pectoral fins are otherwise known only from rare specimens of *Pseudochromis fuscus*. Distinguishing features of this latter species are discussed under *Comparisons* for *M. paranox* and *M. winterbottomi*.

In describing *M. polynemus* and *M. splendens* as new species of *Pseudochromis*, Fowler (1931b) assigned the former species to the nominate subgenus *Pseudochromis* and the latter to his subgenus *Klunzingerina* (a synonym of *Ogilbyina*).

Fowler (1931b: 39) noted that *M. polynemus* bears a close superficial resemblance to "certain species of *Pomacentrus*." Lubbock & Goldman (1976: 63) observed live *M. paranox* and noted that the species was only observed in association with the similarly coloured pomacanthid *Centropyge nox* Bleeker, with which it shared a unique "dancing" mode of swimming. They suggested that the two species were involved in a mimetic relationship, with the pseudochromid the probable mimic. The characteristic eye-bar of *M. splendens* is unique among pseudochromids and the overall coloration of the species is suggestive of certain *Chaetodon* and *Chaetodontoplus* species (families Chaetodontidae and Pomacanthidae, respectively), which also have eye-bars. Furthermore, based on field notes made by the late R. Lubbock, it is possible that *M. winterbottomi* is involved in a mimetic relationship with *C. nox*, although it has not been observed exhibiting the characteristic dancing motion employed by *M. paranox*. It is therefore possible that the four species are mimics.

All five *Manonichthys* species have been observed entering sponges and are probably facultative sponge dwellers. This is noteworthy since there are few records of

either facultative or obligate sponge-dwelling behaviour in Indo-Pacific fishes (among gobiids, the genera *Phyllogobius* Larson and *Luposicya* Smith are obligate sponge dwellers, as are *Pleurosicya elongata* Larson, *P. labiata* (Weber) and *P. spongicola* Larson, while *P. mossambica* Smith is a facultative sponge dweller; Larson, 1990), although it is a relatively common phenomenon in Caribbean species, particularly in gobiids (Tyler & Böhlke, 1972; Gilbert & Burgess, 1986). It is also noteworthy that Winterbottom (1980) recorded sponge-dwelling behaviour in the congrogadine pseudochromid *Congrogadus (Congrogadoides) amplimaculatus* (Winterbottom).

The five *Manonichthys* species are distinguished from each other primarily on the basis of coloration, head scalation, caudal-fin shape and fin-ray and scale counts. They are allopatrically distributed throughout the Indo-Australian Archipelago.

ETYMOLOGY: *Manonichthys* is a combination of the Greek *manon*, a kind of sponge, and *ichthys*, fish, and alludes to the sponge-dwelling behaviour of the included species. Gender is masculine.

Key to species of *Manonichthys*

1a. At least some pectoral-fin rays black 2
1b. Pectoral-fin rays hyaline 3

2a. Pectoral-fin rays 17-19 (usually 18-19); horizontal scale rows above anal-fin origin to anterior lateral line 13-17; circumpeduncular scales 18-21; upper opercular scales cycloid (Papua New Guinea, northern Great Barrier Reef and Solomon Ids) ..... *M. paranox*
2b. Pectoral-fin rays 16-17; horizontal scale rows above anal-fin origin to anterior lateral line 12-13; circumpeduncular scales 16; at least some upper opercular scales ctenoid (Cebu, Philippines) ..... *M. winterbottomi* sp. nov.

3a. Curved dark brown to black bar extending from nape through eye to interopercle (southeastern Indonesia)..*M. splendens*
3b. Coloration not as above 4

4a. Predorsal scales 17-22, extending anteriorly to point ranging from anterior AIO pores to posterior nasal pores; caudal fin rounded to truncate (northern Borneo).... *M. alleni* sp. nov.
4b. Predorsal scales 16-30, 25-30 in specimens larger than 30 mm SL, extending anteriorly to point ranging from posterior AIO pores to slightly anterior of anterior nostrils (anterior to posterior nostrils in specimens larger than 30 mm SL); caudal fin emarginate in small (< 30 mm SL) specimens, becoming strongly emarginate to lunate in larger specimens (northeastern Indonesia and Belau) ..... *M. polynemus*

***Manonichthys alleni* sp. nov.**
Sabah Dottyback
Figures 14-15; Plates 2D-E

Pseudochromis sp.; Wood et al., 1994: 124 (list; Pulau Sipidan); Kuiter & Debelius, 1997: 115 (colour fig.; distribution and

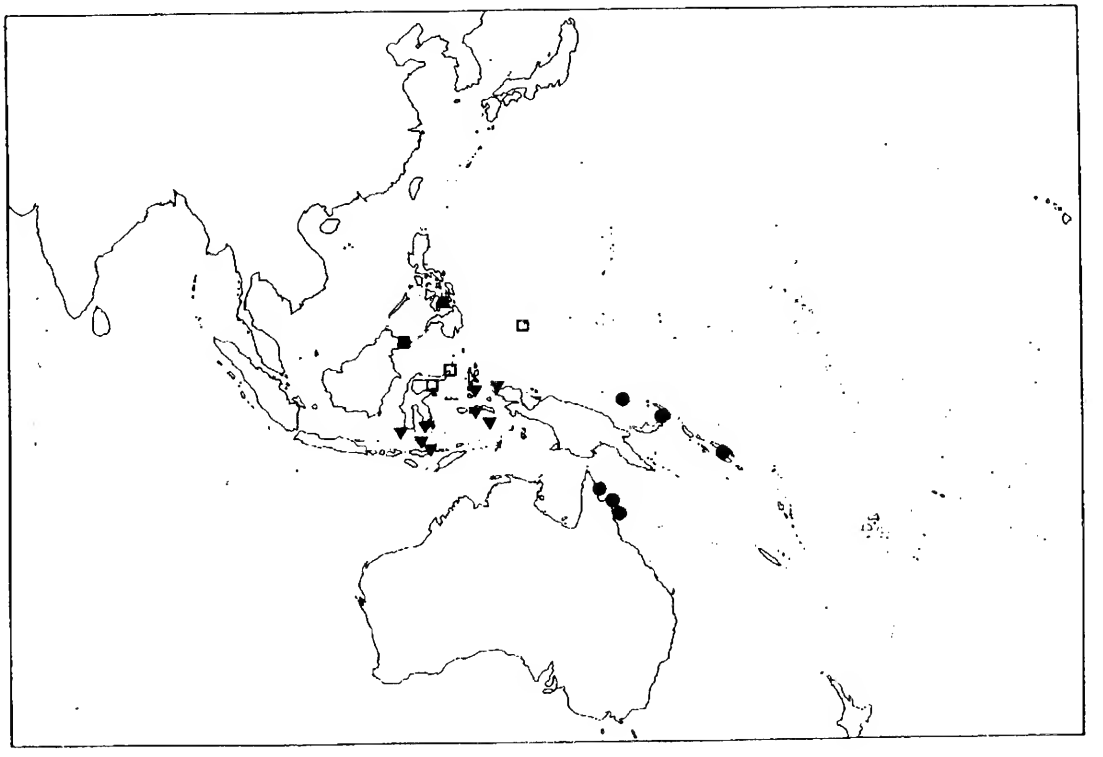

Figure 14. Distributional records for *Manonichthys alleni* (closed square), *M. paranox* (closed circles), *M. polynemus* (open squares), *M. splendens* (descending triangles) and *M. winterbottomi* (ascending triangle).

habitat); Allen, 1997: 96, pl. 29-15 (description; distribution; col. fig.).
Pseudochromis sp. 2; Gill, 1999b: 2563 (key).

HOLOTYPE: WAM P.30415-004, 50.6 mm SL, Sabah, Bodgaya Ids, edge of reef 3 km N of Manabuan Id (04°39'N 118°46'E), coral and rubble bottom, 22-23 m, spear, G.R. Allen, 18 February 1992.

PARATYPES: WAM P.30406-009, 1: 28.0 mm SL, Sabah, Bodgaya Ids, off SE end of Sibuan Id (04°38'N 118°39'E), coral, 16-17 m, rotenone, G.R. Allen, 13 February 1992; USNM 290317, 1: 28.4 mm SL, Sabah, Darvel Bay, Pulau Bohidulong, coral reef with steep dropoff, 1.5-3.5 m, 2 February 1965 (Te Vega Cruise 6, station 216); USNM 306719, 1: 33.6 mm SL (cleared and stained), collected with USNM 290317; USNM 339259, 1: 41.2 mm SL, collected with USNM 290317.

DIAGNOSIS: *Manonichthys alleni* is distinguished from congeneric species in having the following combination of characters: pectoral fins hyaline; at least some cheek and opercular scales ctenoid; caudal-fin rounded to truncate; predorsal scales 17-22, extending anteriorly to point ranging from anterior AIO pores to posterior nasal pores; and no dark more-or-less vertical bar extending from above and below eye.

DESCRIPTION (based on five specimens, 28.0-50.6 mm SL; minimum and maximum value ranges given first for all type specimens, followed, where different, by values for holotype enclosed in parentheses): dorsal-fin rays III,28-29 (III,29), last 7-10 (9) segmented rays branched; anal-fin rays III,14-15 (III,15), last 10-14 (14) segmented rays branched; pectoral-fin rays 17; upper procurrent caudal-fin rays 6; lower procurrent caudal rays 5-6 (6); total caudal-fin rays 28-29 (29); scales in lateral series 35-38 (37/38); anterior lateral-line scales 24-29 (24/28); anterior lateral line terminating beneath segmented dorsal-fin ray 15-21 (15/19); posterior lateral-line scales 6-12 + 0-1 (12 + 0/9 + 0); scales between lateral lines 3-4 (4/4); horizontal scale rows above anal fin origin 12-14 + 1 + 3 = 16-18 (13 + 1 + 3/14 + 1 + 3); circumpeduncular scales 16; predorsal scales 17-22 (22); scales behind eye 2-3 (3); scales to preopercular angle 4-5 (5); gill rakers 4-6 + 12 = 16-18 (5 + 12); pseudobranch filaments 9-11 (10); circumorbital pores 17-23 (20/20); preopercular pores 9-13 (9/10); dentary pores 4; posterior interorbital pores 1.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from anterior AIO pores to posterior nasal pores; opercle with 4-5 well-developed serrations; teeth of outer ceratobranchial-1 gill rakers well developed on tips only; anterior dorsal-fin pterygiophore formula S/S/S + 3 + 1/1 + 1/1 + 1*/1 (S/S/S + 3 + 1/1 + 1/1/1 + 1); dorsal-fin spines moderately stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1/1 + 1 (3/1/1 + 1/1/1 + 1); anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout and pungent; second or third segmented pelvic-fin ray longest; caudal fin rounded to truncate; vertebrae 10 + 16; epineurals 13-14 (14); epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 2-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 3-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on four specimens, 28.0-50.6 mm SL): head length 23.3-28.9 (23.3); orbit diameter 8.1-11.6 (8.1); snout length 5.7-6.4 (5.7); fleshy interorbital width 5.7-6.8 (5.7); bony interorbital width 4.2-4.6 (4.2); body width 12.3-12.9 (12.3); snout tip to posterior tip of retroarticular bone 13.8-16.2 (13.8); predorsal length 28.9-35.6 (28.9); prepelvic length 30.0-34.5 (30.0); posterior tip of retroarticular bone to pelvic-fin origin 17.7-19.7 (18.0); dorsal-fin origin to pelvic-fin origin 30.2-32.7 (30.2); dorsal-fin origin to middle dorsal-fin ray 35.0-39.3 (38.9); dorsal-fin origin to anal-fin origin 43.0-49.8 (45.5); pelvic- fin origin to anal-fin origin 27.1-31.3 (28.7); middle dorsal-fin ray to dorsal-fin termination 25.7-29.3 (27.3); middle dorsal-fin ray to anal-fin origin 25.4-32.3 (29.1); anal-fin origin to dorsal-fin termination 35.2-39.1 (39.1); anal-fin base length 26.8-31.4 (31.4); dorsal-fin termination to anal-fin termination 14.8-16.0 (16.0); dorsal-fin termination to caudal peduncle dorsal edge 7.8-10.6 (9.7); dorsal-fin termination to caudal peduncle ventral edge 17.5-18.6 (18.2); anal-fin termination to caudal peduncle dorsal edge 18.0-20.1 (20.0); anal-fin termination to caudal peduncle ventral edge 10.0-13.0 (11.1); first dorsal-fin spine 2.5-4.4 (3.0); second dorsal-fin spine 7.1-9.3 (7.1); third dorsal-fin spine 10.1-12.1 (10.1); first segmented dorsal-fin ray 14.2-16.1 (14.2); fourth last segmented dorsal-fin ray 16.9-24.7 (24.7); first anal-fin spine 3.4-5.3 (3.4); second anal-fin spine 10.1-12.6 (10.1); third anal-fin spine 10.6-12.5 (11.3); first segmented anal-fin ray 13.0-16.1 (14.0); fourth last segmented anal-fin ray 15.5-25.3 (25.3); third pectoral-fin ray 16.8-18.9 (16.8); pelvic-fin spine 11.9-14.6 (11.9); second segmented pelvic-fin ray 24.3-28.7 (28.7); caudal-fin length 23.9-25.3 (25.3).

Live coloration (based on photographs of specimens from Bodgaya Ids, Sangalakki Id and Pulau Sipidan, Sabah; Plates 2D-E): head greyish blue, darker dorsally, becoming maroon to purplish blue on operculum, with large pale pinkish yellow spot in centre of each scale; several short dark reddish purple stripes on operculum immediately behind vertical edge of preopercle; snout, lips and anterior part of head in front of vertical through middle of eyes sometimes abruptly pale yellowish grey; iris bluish or reddish grey to bright red, with bright blue suboval ring around pupil; breast, pectoral-fin base and dorsal half of body dark bluish to purplish grey; scales of nape and dorsal part of body each with bright yellow central spot, spots becoming larger ventrally in small specimens so that grey coloration is reduced to series of stripes along dorsal and ventral edges of horizontal scale rows, and ventral part of body is bright yellow; grey stripes becoming wider and extending further ventrally in larger specimens, so that entire ventral part of body of larger specimens bluish to purplish grey with small yellow spots on centre of each scale; caudal

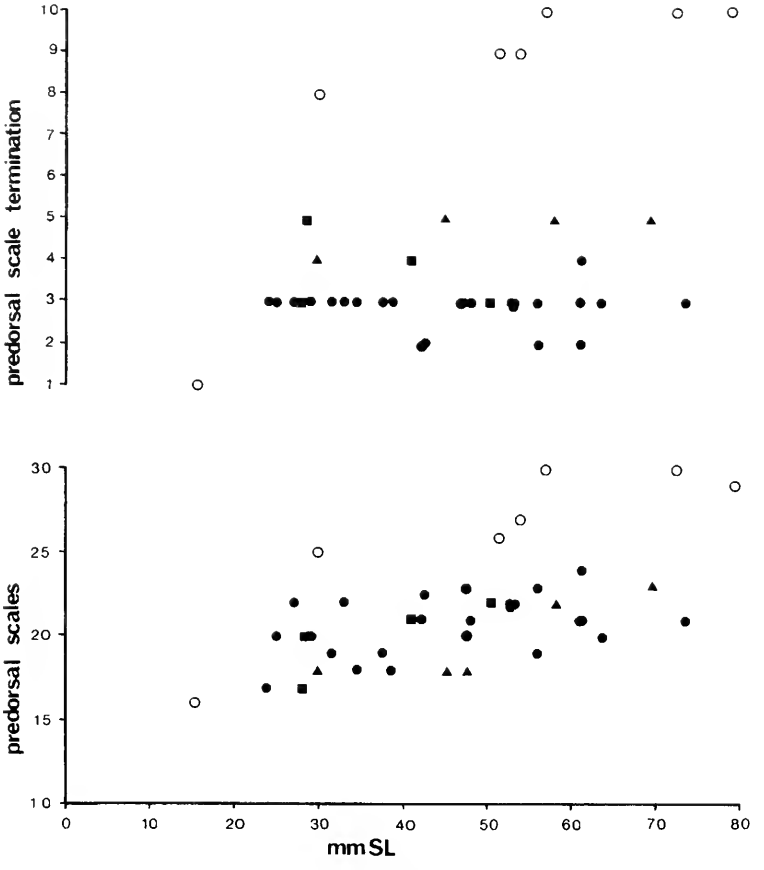

Figure 15. Plots of predorsal scale counts and predorsal scale terminations against standard length for *Manonichthys alleni* (squares), *M. polynemus* (open circles), *M. splendens* (closed circles) and *M. winterbottomi* (triangles). Predorsal scale termination numbers correspond to the following position: 1, posterior AIO pores; 2, mid-AIO pores; 3, anterior AIO pores; 4, midway between anterior AIO and posterior nasal pores; 5, posterior nasal pores; 6, midway between posterior nasal pores and posterior nostrils; 7, posterior nostrils; 8, midway between nostrils; 9, anterior nostrils; 10, anterior nasal pores.

peduncle bright yellow (juveniles) to pale grey (large adults), sometimes with grey edging on some scales; basal two-thirds to three-quarters of dorsal fin blue-black with one to four horizontal to oblique rows of white to pale blue or pale orange horizontally elongate spots, these tending to align, forming irregular arcs on middle and posterior part of fin; distal quarter to third of fin bluish or yellowish grey to greyish hyaline, with bright blue distal margin, this edged proximally with bright red in large adults; anal fin of juveniles bright yellow, sometimes becoming orange-yellow distally, with bright blue distal margin, this edged proximally on spinous portion of fin with orange to bright red; anal fin of large adults similar to dorsal fin; caudal fin bright yellow (juveniles) to pale grey or white (large adults), with distal margin abruptly hyaline to dusky hyaline; pectoral fins yellowish or greyish hyaline to hyaline; pelvic fins bright yellow (juveniles) to pale grey (large adults), with anterior margin bright blue and one or two large, irregular crimson spots on anterior part of fins.

Preserved coloration: pattern similar to live coloration, the blue and grey areas on head and body becoming brown to dark grey-brown; bright yellow areas on head and body becoming pale yellow to pale brown; blue and dark markings on fins becoming grey-brown to black; white, yellow, orange and crimson markings on fins becoming pale yellow to pale brown.

HABITAT AND DISTRIBUTION: *Manonichthys alleni* is known only from the vicinity of Darvel Bay, Sabah, northern Borneo (Figure 14). It has been collected and photographed in coral and rubble areas in 1.5 to 40 m. As in other *Manonichthys* species, it has been observed entering sponges (Kuiter & Debelius, 1997).

COMPARISONS: This species resembles *M. polynemus* and *M. splendens* in general morphology and in having ctenoid scales on the head and hyaline pectoral-fin rays. The three species are readily distinguished on the basis of coloration (*M. splendens* possesses a curved dark bar through the eye, which is absent in *M. alleni* and *M. polynemus*), caudal-fin shape (emarginate in small specimens, becoming strongly emarginate in large specimens of *M. polynemus*, versus rounded to truncate in *M. alleni* and *M. splendens*), number of anal-fin rays (14-15 for *M. polynemus* and *M. alleni*, and 15-16 for *M. splendens*); caudal peduncle length (anal-fin termination to caudal peduncle ventral edge 10.0-13.0 % SL in *M. alleni*, 10.7-13.5 % SL in *M. splendens* and 12.6-14.9 % SL in *M. polynemus*), and the number of predorsal scales (16-30 for *M. polynemus*, versus 17-24 for the other two species) and extent to which these extend anteriorly on the head (to a point ranging from the posterior AIO pores to the anterior nasal pores in *M. polynemus* versus anterior AIO pores to posterior

nasal pores in *M. alleni*, and mid AIO pores to midway between the anterior AIO and posterior nasal pores in *M. splendens*). This latter character is largely size dependent in *M. polynemus*; small specimens tend to have fewer predorsal scales, which do not extend as far forward on the head (Figure 15).

REMARKS: Kuiter & Debelius (1997) provide a live colour photograph and Allen (1997) a colour painting of the species.

ETYMOLOGY: Named in honour of Dr Gerald R. Allen, who provided photographs of the species and collected the holotype and a paratype, in recognition of his contributions to Indo-Pacific ichthyology, and in thanks for the encouragement he has given me during preparation of this and other studies.

MATERIAL EXAMINED: See above.

***Manonichthys paranox* (Lubbock & Goldman)**
Midnight Dottyback
Figures 14, 16

Pseudochromis paranox Lubbock & Goldman, 1976: 60, fig. 2 (type locality: Biki Id, Solomon Ids); Burgess et al., 1988: pl. 153 (colour fig.); Paxton et al., 1989: 520 (list; distribution); Gill, 1990b: 129 (description; distribution; colour fig.); Lieske & Myers, 1994: pl. 31, fig. 13 (colour fig.; habitat and distribution); Gill, 1999b: 2563 (key).

DIAGNOSIS: A species of *Manonichthys* with the following combination of characters: pectoral fins black; scales on head cycloid; and scales above anal-fin origin to anterior lateral line 13-17. It is further distinguished from all other *Manonichthys* in having 18-21 circumpeduncular scales.

DESCRIPTION (based on 23 specimens, 19.5-65.7 mm SL): dorsal-fin rays III,28-31, last 4-12 segmented rays branched; anal-fin rays III,16-18, last 5-17 segmented rays branched; pectoral-fin rays 17-19; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 29-31; scales in lateral series 36-42; anterior lateral-line scales 22-34; anterior lateral line terminating beneath segmented dorsal-fin ray 15-23; posterior lateral-line scales 0-17 + 0-3; scales between lateral lines 3-5; horizontal scale rows above anal-fin origin 13-17 + 1 + 3-4 = 18-21; circumpeduncular scales 18-21; predorsal scales 18-25; scales behind eye 2-4; scales to preopercular angle 4-7; gill rakers 4-6 + 11-13 = 16-19; pseudobranch filaments 7-11; circumorbital pores 13-30; preopercular pores 7-15; dentary pores 4; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without distinct scale sheaths, although frequently with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of posterior AIO pores to posterior nostrils; opercle with 4-6 relatively well-developed serrations; teeth of outer ceratobranchial-1 gill rakers well developed on tips of distal halves of rakers only; anterior dorsal-fin pterygiophore formula S*/S/S + 3 + 1*/1 + 1*/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1 + 1*; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout and pungent; second or third segmented pelvic-fin ray longest; caudal fin rounded; vertebrae 10 + 16; epineurals 12-15; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 2-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 3-5 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 15 specimens, 22.4-56.0 mm SL): head length 22.3-29.5; orbit diameter 8.0-11.6; snout length 5.5-6.7; fleshy interorbital width 5.2-6.4; bony interorbital width 3.5-4.1; body width 11.0-13.0; snout tip to posterior tip of retroarticular bone 13.7-16.1; predorsal length 28.8-34.8; prepelvic length 29.6-34.3; posterior tip of retroarticular bone to pelvic-fin origin 16.2-20.7; dorsal-fin origin to pelvic-fin

Figure 16. *Manonichthys paranox*, BMNH 1979.1.9.31, 53.0 mm SL, Los Negros Id, Bismarck Archipelago, Papua New Guinea. (Photo by P. Crabb)

origin 28.1-33.0; dorsal-fin origin to middle dorsal-fin ray 32.1-40.4; dorsal-fin origin to anal-fin origin 40.6-46.3; pelvic-fin origin to anal-fin origin 24.8-32.7; middle dorsal-fin ray to dorsal-fin termination 24.6-31.8; middle dorsal-fin ray to anal-fin origin 27.2-35.0; anal-fin origin to dorsal-fin termination 35.7-45.7; anal-fin base length 26.7-36.3; dorsal-fin termination to anal-fin termination 15.1-18.6; dorsal-fin termination to caudal peduncle dorsal edge 7.9-10.7; dorsal-fin termination to caudal peduncle ventral edge 17.8-20.4; anal-fin termination to caudal peduncle dorsal edge 18.6-21.4; anal-fin termination to caudal peduncle ventral edge 8.8-11.2; first dorsal-fin spine 2.3-4.2; second dorsal-fin spine 6.0-7.7; third dorsal-fin spine 8.6-11.2; first segmented dorsal-fin ray 13.9-17.4; fourth last segmented dorsal-fin ray 17.7-22.6; first anal-fin spine 3.1-4.8; second anal-fin spine 8.6-12.0; third anal-fin spine 9.8-12.2; first segmented anal-fin ray 12.7-15.1; fourth last segmented anal-fin ray 16.5-23.9; third pectoral-fin ray 15.5-20.8; pelvic-fin spine 11.1-14.7; second segmented pelvic-fin ray 21.9-33.3; caudal-fin length 23.2-26.2.

Live coloration [based on colour description provided by Lubbock & Goldman (1976), colour figures in Burgess et al. (1988) and Gill (1990b), and field notes taken by R. Lubbock on specimens from Papua New Guinea]: head and body black, sometimes with reddish brown tinges on head; iris dark reddish grey; all fins black, pelvics sometimes with red patch anteriorly.

Preserved coloration: head and body uniform dark grey-brown to black; all fins dark grey to black, fin rays reddish brown when viewed with transmitted light; large pale grey spot sometimes present between first and second segmented pelvic-fin rays.

HABITAT AND DISTRIBUTION: *Manonichthys paranox* was previously known only from the Solomon Ids and the northern Great Barrier Reef (Paxton et al., 1989: 520). Based on material in the Natural History Museum collected by the late R. Lubbock, its range is here extended to include New Britain and the Admiralty Ids (Figure 14). Lubbock (unpublished field notes) noted that it sometimes enters the cavities of "blue tabular sponges." It has been collected mainly from around corals and rocks on reef slopes and drop-offs at depths ranging from 18 to 40 m.

COMPARISONS: The relatively high number of circumpeduncular scales readily distinguishes *M. paranox* from congeners. Aside from *M. paranox* and *M. winterbottomi*, black pectoral fins are known only in rare specimens of *Pseudochromis fuscus*. This latter species differs from *M. paranox* in having two rows of well-developed teeth running most of the length of the outer ceratobranchial-1 gill rakers (versus well developed only on raker tips in *M. paranox*) and usually fewer segmented dorsal- and anal-fin rays [25-29 (usually 26-28) and 13-15 (usually 14), respectively, versus 28-31 and 16-18].

REMARKS: *Manonichthys paranox* is a moderate-sized pseudochromine; the largest specimen examined measured 65.7 mm SL. Live colour photographs of the species are given in Burgess et al. (1988: pl. 153) and Gill (1990b).

As noted above, this species is involved in a mimetic relationship with the pomacanthid *Centropyge nox*. Lubbock & Goldman (1976) suggested that *C. nox* was the model and that *M. paranox* was the mimic. Several *Acanthurus* species (family Acanthuridae) are also involved in mimetic relationships with members of the genus *Centropyge* (Randall & Randall, 1960), with the pomacanthids again acting as the presumptive models. Randall & Guézé (1980) have suggested the following reason for mimiery by the acanthurids. *Centropyge* species are generally agile, relatively fast-swimming fishes that are able to avoid predation by darting into reef crevices. They are therefore relatively costly prey and predators should learn to avoid these fishes and concentrate on easier prey. Mimicry of the *Centropyge* species by the acanthurids, which are generally less agile, may thus allow them to avoid predation. Although mimicry by *M. paranox* may serve to reinforce predator deterrence, it seems unlikely that this species gains from the same selective advantages as the acanthurids, as most pseudochromids are in themselves very agile fishes. It is more likely that they are aggressive mimics, where the pseudochromid mimic (a predator) would be able to safely approach small prey fishes by being confused with the pomacanthid model (an omnivorous grazer).

ETYMOLOGY: The specific name epithet is derived from the Greek *para*, beside or near, and *nox*, with reference to the mimetic relationship of the species with *Centropyge nox*.

MATERIAL EXAMINED: PAPUA NEW GUINEA: Bismark Archipelago, Los Negros Id, BMNH 1979.1.9.31, 1(1), 53.0 mm SL; New Britain, Bai, BMNH 1979.1.9.27-28, 2(2), 43.1-50.0 mm SL, BMNH 1979.1.9.29-30, 2(0); New Britain, Nodup, BMNH 1979.1.9.24-26, 3(3), 41.6-56.0 mm SL; Credner Id, BMNH 1979.1.9.22, 1(1), 65.7 mm SL. SOLOMON IDS: Sandfly Passage, S side of Biki Id, AMS I.18244-001, 1(1), 31.0 mm SL (holotype), AMS. I.18244-002, 1(1), 34.7 mm SL (paratype), BMNH 1975.2.12.4, 1(1), 28.7 mm SL (paratype). EASTERN AUSTRALIA: Coral Sea, Ashmore Reef, AMS I.33717-038, 1(1), 37.0 mm SL, AMS I.33730-021, 1(1), 45.1 mm SL, AMS I.33731-068, 2(2), 19.5-22.4 mm SL; Great Barrier Reef, N end of Tijou Reef, AMS I.20779-173, 5(5), 20.2-45.5 mm SL, AMS I.20779-225, 2(2), 27.7-31.5 mm SL (subsequently cleared and stained), QM I.16044, 1(1), 55.3 mm SL; Escape Reef, AMS I.22613-015, 1(1), 38.1 mm SL.

***Manonichthys polynemus* (Fowler)**

Thread-finned Dottyback

Figures 14-15; Plate 2F

Pseudochromis (Pseudochromis) polynemus Fowler, 1931b: 38, fig. 5 (type locality: Limbe Strait, Celebes).

Pseudochromis polynemus; Myers, 1989: 113, 274, pl. 37e (description; distribution; colour fig.); Lieske & Myers, 1994: pl. 32, fig. 14 (colour fig.; habitat and distribution); Kuiter & Debelius, 1994: 114 (colour fig.; habitat and distribution); Kuiter & Debelius, 1997: 114 (colour fig.; habitat and distribution); Allen, 1997: 96, pl. 29-12 (description; distribution; col. fig.); Myers, 1999: 121, 297, pl. 48F (description; distribution; colour fig.); Gill, 1999b: 2575 (description; distribution; fig.).

DIAGNOSIS: *Manonichthys polynemus* differs from congeners

in caudal-fin shape (emarginate in small specimens, becoming strongly emarginate to lunate with increasing size), and in having a relatively high number of predorsal scales (16-30; 25-30 in specimens larger than 30 mm SL), which extend farther anteriorly on the head (to point ranging from posterior AIO pores to slightly anterior of anterior nostrils; anterior to posterior nostrils in specimens larger than 30 mm SL).

DESCRIPTION (based on seven specimens, 15.3-80.0 mm SL): dorsal-fin rays III,27-29, last 8-12 segmented rays branched; anal-fin rays III,14-15, last 9-13 segmented rays branched; pectoral-fin rays 16-18; upper procurrent caudal-fin rays 6; lower procurrent caudal-fin rays 6; total caudal-fin rays 29; scales in lateral series 36-41; anterior lateral-line scales 18-32; anterior lateral line terminating beneath segmented dorsal-fin ray 13-26; posterior lateral-line scales 0-17 + 0-2; scales between lateral lines 2-4; horizontal scale rows above anal-fin origin 13-14 + 1 + 3-4 = 17-19; circumpeduncular scales 16-17; predorsal scales 16-30; scales behind eye 2-4; scales to preopercular angle 5-7; gill rakers 4-5 + 12-13 = 17-18; pseudobranch filaments 5-14; circumorbital pores 12-35; preopercular pores 7-17; dentary pores 4; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without well-developed scale sheaths, although usually with low scale sheaths posteriorly; predorsal scales extending anteriorly to point ranging from posterior AIO pores to slightly anterior to anterior nostrils (anterior to posterior nostrils in specimens larger than 30 mm SL); opercle with 4-8 weakly to relatively well-developed serrations; teeth of outer ceratobranchial-1 gill rakers usually well developed on raker tips only, although well-developed teeth may run most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3 + 1/1 + 1/1/1 + 1/1/1/1 + 1*; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1/1 + 1*/1; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout and pungent; second segmented pelvic-fin ray longest; caudal fin emarginate in small (< 30 mm SL) specimens, becoming strongly emarginate to lunate in larger specimens; vertebrae 10 + 16; epineurals 12-14; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 2-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 2-4 rows of small conical teeth, forming chevron; palatine with 3-5 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on six specimens, 30.0-80.0 mm SL): head length 21.6-27.7; orbit diameter 7.1-10.7; snout length 5.4-6.3; fleshy interorbital width 6.1-6.9; bony interorbital width 4.6-5.3; body width 11.9-12.7; snout tip to posterior tip of retroarticular bone 14.0-15.3; predorsal length 28.8-32.7; prepelvic length 30.7-37.7; posterior tip of retroarticular bone to pelvic-fin origin 18.0-25.3; dorsal-fin origin to pelvic-fin origin 32.3-35.9; dorsal-fin origin to middle dorsal-fin ray 31.0-40.0; dorsal-fin origin to anal-fin origin 42.3-50.2; pelvic-fin origin to anal-fin origin 27.0-31.8; middle dorsal-fin ray to dorsal-fin termination 26.6-29.9; middle dorsal-fin ray to anal-fin origin 30.0-34.8; anal-fin origin to dorsal-fin termination 35.7-39.5; anal-fin base length 26.3-29.6; dorsal-fin termination to anal-fin termination 16.3-18.0; dorsal-fin termination to caudal peduncle dorsal edge 11.5-12.8; dorsal-fin termination to caudal peduncle ventral edge 19.4-20.4; anal-fin termination to caudal peduncle dorsal edge 20.6-22.5; anal-fin termination to caudal peduncle ventral edge 12.6-14.9; first dorsal-fin spine 2.4-4.0; second dorsal-fin spine 5.5-8.3; third dorsal-fin spine 8.4-11.7; first segmented dorsal-fin ray 13.8-15.3; fourth last segmented dorsal-fin ray 19.0-45.7; first anal-fin spine 2.9-5.0; second anal-fin spine 7.1-13.0; third anal-fin spine 8.5-12.7; first segmented anal-fin ray 12.5-16.0; fourth last segmented anal-fin ray 20.3-38.8; third pectoral-fin ray 16.7-18.6; pelvic-fin spine 10.5-14.5; second segmented pelvic-fin ray 30.3-58.4; caudal-fin length 24.3-25.7.

Live coloration [based on colour description by Fowler (1931b), photographs of specimens from Sulawesi, and field notes on a specimen from Belau; Plate 2F]: head brownish to bluish grey; body dark bluish to greenish grey, paler ventrally, sometimes with dorsal and ventral margins of caudal peduncle grey to dark grey; scales of cheek, operculum and body excluding dorsal contour of nape each with large central dull yellow to bright orange spot, these becoming pale yellowish grey to white ventrally on body, and tending to coalesce, forming stripes; pale yellow to bright orange ring around orbit, this broader ventrally and extending behind and below posterior edge of maxilla; yellow to orange ring sometimes bordered posteriorly with dark bluish grey; iris bluish grey, with bright blue suboval ring around pupil; dorsal fin dark grey with about three to seven horizontal rows of white to yellow horizontally elongate spots; posterior part of dorsal fin behind about fifth-last ray white to hyaline, this broadly edged distally and basally with dark grey to black; hyaline to white area sometimes with several rows of dark blue spots; distal margin of dorsal fin bright blue; anal fin pale grey basally with distal third of fin dark grey to black, sometimes with two indistinct horizontal rows of yellow spots on pale grey portion of fin; posterior part of fin behind about fourth- to sixth-last ray white to hyaline, this broadly edged basally with pale grey and distally with dark grey; distal margin of fin bright blue; caudal fin bluish grey basally, becoming whitish to hyaline posteriorly; pectoral fins hyaline; pelvic fins white to grey, bluish grey to bright blue anteriorly, with basal part of fin behind second segmented ray bright yellow to bright red.

Preserved coloration: pattern similar to live coloration, head and body becoming brown, paler ventrally on head and abdomen; yellow to orange markings on head and body becoming pale yellowish brown; dorsal and anal fins becoming dusky brown to dark grey anteriorly and dusky hyaline to hyaline posteriorly, white to yellow spots becoming whitish brown to pale grey; caudal fin pale brown to hyaline; pectoral fins dusky hyaline to hyaline; pelvic fins whitish brown basally where bright yellow to bright red in life, remainder of fin dusky brown.

HABITAT AND DISTRIBUTION: Until recently,

Manonichthys polynemus was known only on the basis of the holotype from Limbe (= Lembeh) Strait, Celebes (= Sulawesi). G.R. Allen collected another specimen from Lembeh Strait. R.H. Kuiter (pers. comm.) recently sighted and photographed the species in the vicinity of Sulawesi, stating that it was "very common" at the Togian Ids, Tomini Bay and at various islands to the north of Sulawesi. Myers (1989, 1999) recorded *M. polynemus* from Belau on the basis of a sight record; this locality record is verified here from specimens in the BPBM (Figure 14). According to Myers (1989, 1999; see also Lieske & Myers, 1994, and Allen, 1997), the species also occurs in the Philippines. It has been collected mainly from reef slopes and drop-offs at depths ranging from 2 to 50 m; like other *Manonichthys* species, it has been observed entering the cavities of large sponges (R.H. Kuiter, pers. comm.; Kuiter & Debelius, 1994, 1997).

COMPARISONS: *Manonichthys polynemus* resembles *M. alleni* and *M. splendens* in having hyaline pectoral fins. Characters distinguishing these three species are discussed under *Comparisons* for *M. alleni*.

REMARKS: *Manonichthys polynemus* is a moderately large species; the largest specimen examined measured 80.0 mm SL. Although Myers (1989) recorded a maximum standard length of 105 mm for this species, this was apparently based on the total length of 105 mm given by Fowler (1931b) for the holotype. Live colour photographs of the species are given in Myers (1989, 1999) and Kuiter & Debelius (1994).

Fowler (1931b: 39) suggested that this species bore a "great superficial resemblance to certain species of *Pomacentrus*." Although this suggests mimicry, there are no pomacentrid species to which *M. polynemus* bears a striking resemblance. The most likely candidates are probably certain *Chromis* species such as *C. acares* Randall & Swerdloff, *C. lineata* Fowler & Bean and *C. vanderbilti* (Fowler), all of which have fairly similar colourations to *M. polynemus* and occur in large aggregations on much the same habitat (seaward reefs and reef slopes). Under such conditions, where the model forms aggregations, close colour pattern matching may not be a necessity for effective mimicry. However, further studies are needed to verify this.

ETYMOLOGY: The specific epithet is from the Greek *polys*, many, and *nema*, thread, with reference to the elongate caudal-fin, pelvic-, anal- and dorsal-fin tips.

MATERIAL EXAMINED: INDONESIA: Sulawesi (Celebes), Lembeh Strait (Limbe Strait), USNM 89992, 1(1), 72.3 mm SL (holotype); Sulawesi, Lembeh Strait, 1°40'S 125°20'E, WAM P.30888-002, 1(1), 80.0 mm SL. BELAU: Augulpelu Reef, BPBM 13489, 1(1), 51.6 mm SL, BPBM 9933, 1(1), 15.3 mm SL, BPBM 9934, 3(3), 30.0-56.8 mm SL.

Manonichthys splendens (Fowler)

Splendid Dottyback

Figures 14-15; Plates 2G-H

Pseudochromis (Klunzingerina) splendens Fowler, 1931b: 35 (type locality: Dowarra Id, Indonesia)

Pseudochromis splendens; Schultz, 1967: 20, fig. 2 (colour fig. of holotype); Baensch & Debelius, 1992: 982 (colour figs; habitat notes); Kuiter, 1992: 41, fig. a (colour fig.); Gill, 1993: 50 (habitat and distribution; colour fig.); Lieske & Myers, 1994: pl. 32, fig. 15 (colour fig.; habitat; distribution in part); Allen & Steene, 1994: 278 (colour fig.); Kuiter & Debelius, 1994: 115 (colour fig.; habitat and distribution); Eichler & Myers, 1997: 117 (distribution; colour fig.); Kuiter & Debelius, 1997: 115 (colour fig.; habitat and distribution); Allen, 1997: 96, pl. 29-10 (description; distribution; col. fig.); Gill, 1999b: 2562 (key).

DIAGNOSIS: *Manonichthys splendens* is distinguished from congeners in having the following character combination: pectoral fins hyaline; at least some cheek and/or opercular scales ctenoid; 15-16 segmented anal-fin rays; and 17-24 predorsal scales. The presence of a dark, more-or-less vertical eye bar further distinguishes the species from congeners and all other pseudochromids.

DESCRIPTION (based on 24 specimens, 24.0-73.6 mm SL): dorsal-fin rays III,27-29, last 3-12 segmented rays branched; anal-fin rays III,15-16, last 8-15 segmented rays branched; pectoral-fin rays 16-18; upper procurrent caudal-fin rays 6; lower procurrent caudal-fin rays 5-6; total caudal-fin rays 28-29; scales in lateral series 36-40; anterior lateral-line scales 23-32; anterior lateral line terminating beneath segmented dorsal-fin ray 16-25; posterior lateral-line scales 5-18 + 0-3; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 11-14 + 1 + 2-4 = 15-19; circumpeduncular scales 16-17; predorsal scales 17-24; scales behind eye 3-4; scales to preopercular angle 5-7; gill rakers 5-7 + 12-13 = 17-19; pseudobranch filaments 9-12; circumorbital pores 17-28; preopercular pores 7-15; dentary pores 4; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins usually without well-developed scale sheaths, although sometimes with low scale sheaths posteriorly; predorsal scales extending anteriorly to point ranging from mid AIO pores to midway between anterior AIO and posterior nasal pores; opercle with 3-7, usually well-developed serrations; teeth of outer ceratobranchial-1 gill rakers usually well-developed on raker tips only, although well-developed teeth may run most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3 + 1/1 + 1/1 + 1*; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1/1 + 1*/1 + 1*; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout to stout and pungent; third segmented pelvic-fin ray longest in specimens larger than about 30 mm SL, second ray longest in smaller specimens; caudal fin rounded, often with posterior margin of fin weakly rounded or truncate; vertebrae 10 + 16; epineurals 13; epurals 3.

Upper jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 2-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-6 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved;

vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 3-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 20 specimens, 24.0-73.6 mm SL): head length 20.9-30.0; orbit diameter 6.5-13.3; snout length 5.5-7.3; fleshy interorbital width 5.4-7.3; bony interorbital width 4.5-5.0; body width 10.8-13.3; snout tip to posterior tip of retroarticular bone 13.9-17.1; predorsal length 27.2-35.7; prepelvic length 29.0-35.4; posterior tip of retroarticular bone to pelvic-fin origin 16.6-21.3; dorsal-fin origin to pelvic-fin origin 28.8-34.5; dorsal-fin origin to middle dorsal-fin ray 33.8-39.0; dorsal-fin origin to anal-fin origin 42.7-49.7; pelvic-fin origin to anal-fin origin 26.1-33.2; middle dorsal-fin ray to dorsal-fin termination 24.9-30.1; middle dorsal-fin ray to anal-fin origin 25.8-33.5; anal-fin origin to dorsal-fin termination 32.1-42.3; anal-fin base length 25.8-34.2; dorsal-fin termination to anal-fin termination 13.8-17.9; dorsal-fin termination to caudal peduncle dorsal edge 8.6-11.6; dorsal-fin termination to caudal peduncle ventral edge 17.9-20.0; anal-fin termination to caudal peduncle dorsal edge 18.3-21.7; anal-fin termination to caudal peduncle ventral edge 10.7-13.5; first dorsal-fin spine 2.8-4.6; second dorsal-fin spine 6.6-11.3; third dorsal-fin spine 9.4-14.6; first segmented dorsal-fin ray 12.6-17.5; fourth last segmented dorsal-fin ray 15.1-28.7; first anal-fin spine 3.2-5.8; second anal-fin spine 7.9-14.2; third anal-fin spine 8.5-13.3; first segmented anal-fin ray 11.3-17.1; fourth last segmented anal-fin ray 15.6-26.2; third pectoral-fin ray 16.3-19.2; pelvic-fin spine 10.4-16.3; second segmented pelvic-fin ray 22.9-33.5; caudal-fin length 20.8-28.1.

Live coloration (based on colour photographs of specimens from Flores, Indonesia; Plates 2G-H): head pale brownish yellow; dark grey-brown to black curved bar extending anteroventrally from near dorsal origin to mid-dorsal edge of orbit; second dark grey to black bar curving posteroventrally from below mid-ventral edge of orbit along posterior edge of maxilla to anteroventral edge of preopercle; dark bars sometimes edged anteriorly and posteriorly with pale grey to mauve or blue; anterior orbital rim often pale grey to white; remainder of head anterior to bars pale lemon yellow to bright yellow; iris grey to dark grey with dark blue suboval ring around pupil; body bright yellow; body scales with dark purplish grey borders, these forming series of horizontal reticulating lines; dark purplish grey coloration tending to become restricted to dorsal and ventral edges of scales on lower part of body to form series of horizontal lines; scales on breast usually without dark markings; in juveniles reticulated pattern restricted to upper few scale rows beneath dorsal fin, with dark lines less-distinct and restricted on lower part of body to area above anterior part of anal fin; dorsal fin dark grey to black with two to eight horizontal to oblique rows of pale orange to bright yellow spots, these tending to become pale blue to white distally and sometimes posteriorly; subdistal edge of dorsal fin broadly dark grey to black, becoming dusky hyaline posteriorly, distal margin of fin usually bright blue at least anteriorly; anal fin bright yellow with several horizontal to oblique dusky yellow to dark purplish grey or black stripes, distal margin of fin grey to bright blue; basal part of caudal fin bright yellow, remainder of fin hyaline with grey to bright blue distal margin; pectoral fins hyaline; pelvic fins in juveniles bright yellow, greyish to dark grey anteriorly and distally; pelvic fins of adults pale blue to bright blue anteriorly, broadly dark grey to black on middle part of fins, then whitish to bluish hyaline posteriorly.

Preserved coloration: pattern similar to live coloration, dark grey to black areas becoming dark brown to dark grey or black; yellow to orange areas becoming pale yellowish to whitish brown; dark grey to black bar through eye remains; blue areas on fins becoming pale grey.

HABITAT AND DISTRIBUTION: *Manonichthys splendens* is known from throughout eastern Indonesia (Figure 14), and possibly also occurs at Scott Reef, Timor Sea (see *Remarks* below). It has been collected primarily from reef slopes and drop-offs at depths ranging from 3 to 35 m. Collection data for museum material suggest that it is usually associated with corals and small reef caves. However, Kuiter & Debelius (1994) have observed and photographed adults of this species entering the cavities of large, yellow sponges (including *Thalysias vulpina* and *Clathria basilana*), and have observed and photographed juveniles living in small groups among highly branched yellow sponges. Similar sponge-dwelling behaviour is reported here for the other *Manonichthys* species.

COMPARISONS: *Manonichthys splendens* closely resembles *M. alleni* and *M. polynemus* in general morphology. Characters distinguishing these three species are discussed under *Comparisons* for *M. alleni*. The dark, curved, more-or-less vertical bar through the eye persists even after long preservation and readily distinguishes *M. splendens* from all other pseudochromines.

REMARKS: *Manonichthys splendens* is a moderately large species; the largest specimen examined measured 73.6 mm SL. A colour illustration of the holotype is given in Schultz (1967); live colour photographs of the species are provided by Kuiter (1992), Gill, (1993), Allen & Steene (1994), Kuiter & Debelius (1994) and Eichler & Myers (1997).

Two specimens of 29.9 (NTM S.11373-020) and 42.1 mm SL (NTM S.11370-030) from Scott Reef, Timor Sea, may be referable to this species; they were identified by Allen & Russell (1986: 85) as "*Pseudochromis* sp. nov." and by Paxton et al. (1989: 520) as "*Pseudochromis splendens*." The larger specimen is unusual in that it resembles *M. winterbottomi* in being dark grey in coloration with pale grey spots on each horizontal scale row (Plate 2I). However, it differs from *M. winterbottomi* and resembles *M. splendens* in having an indistinct dark curved bar through the eye. The smaller Scott Reef specimen (Plate 2J) has a colour pattern typical of juvenile *M. splendens*. More specimens are needed to assess the status of the Scott Reef population.

Because of the unusual dark bar through the eye, it is possible that *M. splendens* is a mimic of a species of either *Chaetodon* (family Chaetodontidae) or *Chaetodontoplus* (family Pomacanthidae). Although this has not been confirmed by field observations, mimetic behaviour in *M. paranox* and possibly other *Manonichthys* species lends support to this hypothesis.

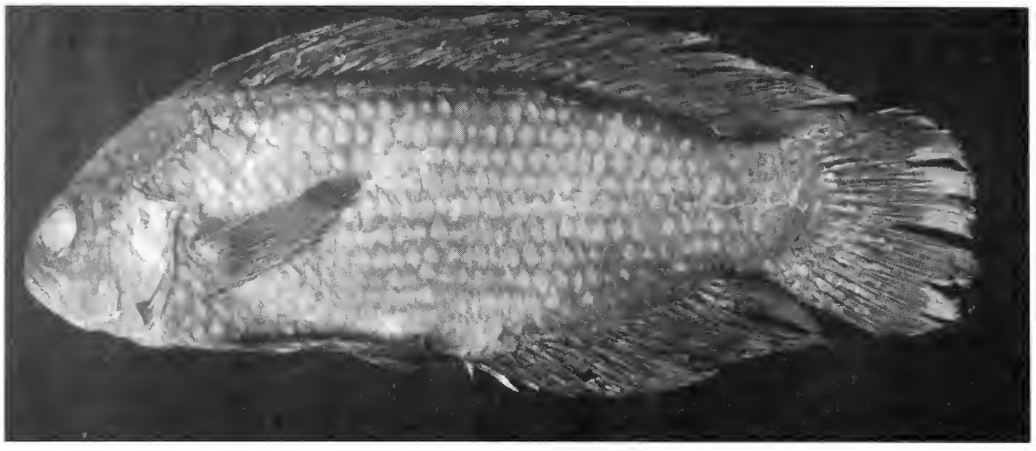

Figure 17. *Manonichthys winterbottomi*, ROM 52857, 70.0 mm SL, holotype, North Baio Bay, Cebu Strait, Philippines. (Photo by P. Crabb)

ETYMOLOGY: The specific epithet is from the Latin *splendeo*, shine, with appropriate reference to the striking coloration.

MATERIAL EXAMINED: INDONESIA: Sulawesi, Kabaena Id, Talabassi Bay, off NW shore of Big Damalawa Islet, USNM 290454, 1(1), 61.0 mm SL, USNM 2900081, 1(1), 24.0 mm SL; Molucca Ids, Dowora-Lamo (Doworra) Id, USNM 89991, 1(1), 73.6 mm SL (holotype); Molucca Ids, Ceram, off Tandjung Namatatuni, USNM 210017, 1(1), 33.2 mm SL (subsequently cleared and stained); Molucca Ids, Ambon, 1 km off Sikula, WAM P.25230-002, 1(1), 53.0 mm SL; Molucca Ids, Ambon, off Eri, WAM P.25242-002, 1(1), 55.9 mm SL; Molucca Ids, Ambon, 2 km E of Sawa Telu, USNM 210263, 2(2), 55.9-60.8 mm SL; Molucca Ids, Saparua, reef off Kulur, USNM 210381, 2(2), 25.0-34.6 mm SL; Molucca Ids, Saparua, off Kampungmahu, USNM 210144, 1(0); Molucca Ids, Nusa Laut, Tandjung Tula, USNM 209891, 1(0); Banda Ids, just W of N tip of Great Banda Id, USNM 290078, 3(3), 26.9-42.2 mm SL; Banda Ids, Goenoeng Api Id, USNM 290751, 3(3), 28.9-37.6 mm SL; Bonerate Id, Telerang Islet, BPBM 31510, 2(2), 42.6-53.1 mm SL; Flores, Pomana Besar Id, CAS 59515, 1(0), 50.3 mm SL, AMS I.34500-014, 1(1), 47.3 mm SL; Flores, off Wailiti, AMS I.34501-037, 1(1), 47.5 mm SL; Takarewataya Id, CAS 59498, 1(1), 52.8 mm SL; Siang Siang Id, CAS 62473, 3(3), 48.0-63.6 mm SL.

***Manonichthys winterbottomi* sp. nov.**
False Midnight Dottyback
Figures 14-15, 17

Pseudochromis sp. 3; Gill, 1999b: 2563 (key).

HOLOTYPE: ROM 52857, 70.0 mm SL, Philippines, Cebu Strait, N side of North Baio Bay near main channel, coral rock, rubble and sand bottom with hard and soft corals, 18-35 m, R. Winterbottom, R.D. Mooi, G.D. Johnson et al., 19 May 1987.

PARATYPES: BMNH 1979.1.9.32-35, 4: 30.1-58.5 mm SL (47.9 mm SL specimen subsequently cleared and stained), Philippines, SW side of Cebu Id, Moalboal, *Millepora* and corals, 8-10 m, R. Lubbock, 7-8 August 1976.

DIAGNOSIS: *Manonichthys winterbottomi* is distinguished from congeneric species in having the following combination of characters: pectoral fins at least partly black; at least some upper opercular scales ctenoid; horizontal scale rows above anal-fin origin to anterior lateral line 12-13; and circumpeduncular scales 16.

DESCRIPTION (based on five specimens, 30.1-70.0 mm SL; minimum and maximum value ranges given first for all type specimens, followed, where different, by values for holotype enclosed in parentheses): dorsal-fin rays III,27-29 (III,27), last 9-12 (12) segmented rays branched; anal-fin rays III,15-16 (III,15), last 12-15 (14) segmented rays branched; pectoral-fin rays 16-17 (17/17); upper procurrent caudal-fin rays 5-6 (6); lower procurrent caudal-fin rays 6; total caudal-fin rays 28-29 (29); scales in lateral series 36-38 (38/38); anterior lateral-line scales 24-30 (28/27); anterior lateral line terminating beneath segmented dorsal-fin ray 17-23 (18/17); posterior lateral-line scales 7-16 + 1-3 (9 + 2/8 + 3); scales between lateral lines 3-4 (4/4); horizontal scale rows above anal-fin origin 12-13 + 1 + 3-4 = 16-18 (12 + 1 + 3/12 + 1 + 3); circumpeduncular scales 16; predorsal scales 18-23 (23); scales behind eye 3-4 (4); scales to preopercular angle 5-7 (7); gill rakers 5-6 + 11-13 = 17-19 (5 + 12); pseudobranch filaments 10-12 (10); circumorbital pores 18-23 (20/21); preopercular pores 9-12 (10/11); dentary pores 4; posterior interorbital pores 1-2 (2).

Lower lip incomplete; dorsal and anal fins without well-developed scale sheaths, although patches of scales present posteriorly on fin bases in some specimens; predorsal scales extending anteriorly to point ranging from anterior AIO pores to posterior nasal pores; opercle with 4-9 relatively well-developed serrations; teeth of outer ceratobranchial-1 gill rakers well developed mainly on tips only; anterior dorsal-fin pterygiophore formula S/S/S + 3 + 1/1 + 1*/1 + 1* (S/S/S + 3 + 1/1/1 + 1); dorsal-fin spines moderately stout and pungent; anterior anal-fin pterygiophore formula 3/1/1 + 1/1/1 + 1; anal-fin spines moderately stout to stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout to stout and pungent; third segmented pelvic-fin ray longest; caudal fin rounded; vertebrae 10 + 16; epineurals 13-15 (14); epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform

teeth anteriorly, and 4-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 2-3 rows of small conical teeth, forming chevron; palatine with 3-5 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on four specimens, 45.4-70.0 mm SL): head length 21.0-23.3 (21.0); orbit diameter 6.7-9.2 (6.7); snout length 5.5-6.3 (6.3); fleshy interorbital width 5.5-6.1 (6.1); bony interorbital width 4.0-4.3 (4.3)); body width 11.3-12.9 (12.9); snout tip to posterior tip of retroarticular bone 12.8-15.0 (13.7); predorsal length 28.4-29.7 (28.6); prepelvic length 29.6-32.2 (31.0); posterior tip of retroarticular bone to pelvic-fin origin 18.5-19.4 (19.3); dorsal-fin origin to pelvic-fin origin 30.8-33.0 (33.0); dorsal-fin origin to middle dorsal-fin ray 34.9-41.1 (41.1); dorsal-fin origin to anal-fin origin 46.3-49.1 (49.1); pelvic-fin origin to anal-fin origin 27.6-33.7 (29.4); middle dorsal-fin ray to dorsal-fin termination 29.3-32.5 (30.9); middle dorsal-fin ray to anal-fin origin 30.7-35.6 (35.6); anal-fin origin to dorsal-fin termination 39.2-42.1 (42.1); anal-fin base length 30.2-33.6 (33.6); dorsal-fin termination to anal-fin termination 17.1-17.7 (17.7); dorsal-fin termination to caudal peduncle dorsal edge 9.0-10.2 (9.4); dorsal-fin termination to caudal peduncle ventral edge 19.7-21.8 (20.4); anal-fin termination to caudal peduncle dorsal edge 20.2-22.5 (21.3); anal-fin termination to caudal peduncle ventral edge 10.0-11.5 (10.0); first dorsal-fin spine 2.7-5.1 (5.1); second dorsal-fin spine 6.6-8.0 (8.0); third dorsal-fin spine 8.4-9.2 (9.1); first segmented dorsal-fin ray 15.0-17.1 (17.1); fourth last segmented dorsal-fin ray 17.8-23.0 (23.0); first anal-fin spine 3.3-4.7 (4.7); second anal-fin spine 8.9-9.4 (9.3); third anal-fin spine 8.6-9.6 (9.6); first segmented anal-fin ray 11.6-13.7 (12.9); fourth last segmented anal-fin ray 17.8-24.8 (20.6); third pectoral-fin ray 14.4-18.9 (18.9); pelvic-fin spine 11.3-12.6 (11.3); second segmented pelvic-fin ray 27.8-32.4 (28.4); caudal-fin length 24.9-27.4 (25.6).

Live coloration (based on a photograph of the holotype and field notes taken by R. Lubbock on the paratypes and other syntopic specimens): head and body dark grey to black; scales of body each with indistinct greyish yellow central spot; iris dark bluish grey, reddish grey ventrally with dark blue suboval ring around pupil; dorsal fin black, sometimes with basal rows of reddish grey spots and two closely positioned, roughly horizontal rows of reddish grey spots along middle of fin; other fins black, except pectoral fins which in juveniles may have small patches of hyaline.

Preserved coloration: pattern similar to live coloration, head and body becoming dark brownish grey, scale spots becoming pale yellowish brown; fins becoming dark grey to black except for hyaline areas on pectoral fins of small specimens.

HABITAT AND DISTRIBUTION: *Manonichthys winterbottomi* is known only from Cebu Id in the Philippines (Figure 14). It has been collected from around corals and *Millepora* at depths ranging from 8 to at least 18 m. According to field notes taken by R. Lubbock of this species at Moalboal, southwestern Cebu, *M. winterbottomi* frequently enters the cavities of "blue tabular sponges."

COMPARISONS: *Manonichthys winterbottomi* closely resembles *M. paranox* in general coloration, particularly in the presence of black pectoral fins. However, *M. paranox* has more pectoral-fin rays (17-19, usually 18-19 versus 16-17), more horizontal scale rows above the anal-fin origin to the anterior lateral line (14-17 versus 12-13) and more circumpeduncular scales (18-21 versus 16) than *M. winterbottomi.* It also has only cycloid scales on the operculum, whereas *M. winterbottomi* has at least a few ctenoid scales covering the upper part of the opercle. Black pectoral fins are otherwise known in pseudochromids only from rare specimens of *Pseudochromis fuscus*. It differs from *M. winterbottomi* in having more circumpeduncular scales (17-23, usually 20), dark (versus pale) spots on the body scales, and well-developed teeth running most of the length of the ceratobranchial-1 outer gill rakers (versus well developed mainly on raker tips only).

REMARKS: *Manonichthys winterbottomi* is a moderately large species; the largest specimen examined measured 70.0 mm SL. In his unpublished field notes, H. Roger Lubbock suggested two possible reasons for the dark coloration of this species: (i) mimicry of *Centropyge nox* (Pomacanthidae); and (ii) camouflage for ambush predation from sponge cavities. Although Lubbock did not see this species actively mimicking the pomacanthid, he noted that *C. nox* was abundant in the area inhabited by *M. winterbottomi*. If it is indeed a mimic, then it is less specialised than *M. paranox* as Lubbock did not observe it employing the characteristic swimming mode used by *C. nox* and *M. paranox*.

ETYMOLOGY: Named in honour of Dr Richard Winterbottom, who assisted with the collection of the holotype, in recognition of his considerable contribution to the systematics of Indo-Pacific fishes (particularly congrogadine pseudochromids), and in appreciation of the encouragement he has provided me in this and other studies.

MATERIAL EXAMINED: See above.

OGILBYINA Fowler

Ogilbyina Fowler, 1931b: 19 [type species: *Dampieria longipinnis* Ogilby (= *Pseudochromis novaehollandiae* Steindachner) by original designation].

Klunzingerina Fowler, 1931b: 33 (type species: *Pseudochromis novaehollandiae* Steindachner by original designation).

DIAGNOSIS: *Ogilbyina* is distinguished from all other pseudochromid genera in having the following combination of external characters: lower lip complete; dorsal-fin segmented rays 31-38; anal-fin segmented rays 18-21; and scales in lateral series 43-56. It is unique among pseudochromines in having small vomerine teeth arranged in a broad triangular patch. In addition, the following osteological characters in combination distinguish it from other genera: third supraneural bone

vestigial or absent; and 4-9 dorsal-fin pterygiophores inserting anterior to neural spine 4.

REMARKS: Fowler (1931b) described *Ogilbyina* (p. 19) and *Klunzingerina* (p. 33) as new subgenera of *Dampieria* Castelnau (= *Labracinus* Schlegel) and *Pseudochromis* Rüppell, respectively. *Dampieria longipinnis* Ogilby and *Pseudochromis novaehollandiae* Steindachner, the respective type species of the two nominal genera, are here regarded to be conspecific. Under my recommendation, Eschmeyer & Bailey (1990: 204) acted as first revisors in listing *Klunzingerina* as a junior synonym of *Ogilbyina*.

Ogilbyina contains three species that have usually been assigned to *Pseudochromis*. Under my recommendation, several recent authors have also included *Pseudochromis veliferus* Lubbock in *Ogilbyina*, but that species is here placed in a separate genus, *Oxycercichthys*. Although *Oxycercichthys* resembles *Ogilbyina* in having the third supraneural reduced in size (much smaller than the other supraneurals) or absent, a complete lower lip, and the posterior lamina of the first dorsal fin pterygiophore running most of the length of the bone, it differs in having lower dorsal- and anal-fin ray counts (II,25-26 and III,16, respectively versus III-IV,31-38 and III,18-21 for *Ogilbyina*), in having a narrow, chevron-shaped patch of relatively large teeth on the vomer (versus a broad, triangular patch of fine teeth in *Ogilbyina*), and in lacking well-developed scale sheaths on the dorsal and anal fins. *Assiculus* and *Assiculoides* also have the third supraneural, lower lip and first dorsal-fin pterygiophore features of *Ogilbyina*, but are readily distinguished from *Ogilbyina* in having, for example, a chevron-shaped patch of vomerine teeth, fewer segmented dorsal- and anal-fin rays (22-24 and 12-14, respectively, in *Assiculus* and 25-27 and 14-16 in *Assiculoides*), more vertebrae (11 + 17-18 in *Assiculus* and 11-12 + 17-19 in *Assiculoides*) and the parhypural fused to the lower hypural plate (versus autogenous in *Ogilbyina*).

Ogilbyina closely resembles *Labracinus* and *Pholidochromis* in having scaly dorsal- and anal-fin bases, a complete lower lip, and the posterior lamina of the first dorsal fin pterygiophore running most of the length of the bone; however, both of these genera have a relatively well-developed third supraneural and relatively large vomerine teeth arranged in a chevron-shaped patch. Moreover, *Ogilbyina* is readily distinguished from *Labracinus* in having larger scales (anterior lateral-line scales 38-50 versus 43-67, scales in lateral series 43-56 versus 52-74), more dorsal-fin rays (III-IV,31-38 versus II,24-26), more segmented anal-fin rays (18-21 versus 13-15) and fewer vertebrae (10 + 16 versus 11 + 16-17), and from *Pholidochromis* in having more segmented dorsal- and anal-fin rays (31-38 versus 22, and 18-21 versus 13, respectively), and smaller scales (anterior lateral line scales 38-50 versus 19-26, scales in lateral series 43-56 versus 28-32, circumpeduncular scales 19-26 versus 16).

Ogilbyina is restricted to the Queensland coast, Great Barrier Reef and southern and western Coral Sea.

ETYMOLOGY: Named *Ogilbyina* for J.D. Ogilby who described the type species. Gender is feminine.

Key to species of *Ogilbyina*

1a. Scales above anal-fin origin 14-16 + 1 + 2-3 = 17-20; circumpeduncular scales 19-20; dark brown (bright blue to dark purple or black in life) spots present on cheeks, operculum, pectoral-fin base and breast (New Caledonia) ..... *O. salvati*
1b. Scales above anal-fin origin 17-23 + 1 + 2-5 = 21-28; circumpeduncular scales 22-26; coloration not as above .. 2

2a. Body relatively shallow, dorsal-fin origin to pelvic-fin origin 24.5-30.7 % SL; lower gill rakers 10-12, usually 11; first dorsal-fin pterygiophore inserted either between first and second neural spines or anterior to first neural spine (southern Queensland) ..... *O. novaehollandiae*
2b. Body relatively deep, dorsal-fin origin to pelvic-fin origin 31.9-35.8 % SL; lower gill rakers 11-13, usually 12; first dorsal-fin pterygiophore inserted between second and third neural spines (Queensland and Great Barrier Reef) .... *O. queenslandiae*

***Ogilbyina novaehollandiae* (Steindachner)**
Multicoloured Dottyback
Figures 5, 18; Plates 3A-C

Pseudochromis novae-Hollandiae Steindachner, 1880: 160 (type locality: Port Denis[on], Queensland, Australia).
Dampieria longipinnis Ogilby, 1908: 34 (type locality: Bowen, Queensland); McCulloch & Whitley, 1925: 150 (list); McCulloch, 1929: 159 (list).
Pseudochromis novae-hollandiae; McCulloch, 1915: 48, p. 15, fig. 1 (description; Masthead Id, Queensland; incorrect synonymy with *Polyacanthus queenslandiae* Saville-Kent); McCulloch & Whitley, 1925: 150 (list, in part); McCulloch, 1929: 157 (list, in part).
Pseudochromis (Pseudochromis) novaehollandiae; McCulloch, 1926: 186 (key).
Dampieria (Ogilbyina) longipinnis; Fowler, 1931b: 19 (compilation).
Pseudochromis (Klunzingerina) novae-hollandiae; Fowler, 1931b: 33 (compilation).
Klunzingerina novaehollandiae; Whitley, 1964a: 42 (list).
Pseudochromis novaehollandiae; Russell, 1983: 44 (Capricorn-Bunker Group, Queensland); Debelius, 1986: 20 (colour fig.); Burgess et al., 1988: pl. 152 (colour fig.); Paxton et al., 1989: 519 (list; distribution); Michael, 1990b: 17 (colour fig.).
Pseudochromis veliferus [*non* Lubbock, 1980]; Burgess et al., 1988: pl. 151 (lower left colour fig.).
Pseudochromis dilectus [*non* Lubbock, 1976]; Michael, 1990b: 17 (colour fig.).
Ogilbyina novaehollandiae; Coleman, 1989: 25 (colour figs); Gill, 1990b: 125 (description; distribution; sexual dimorphism; colour figs); Lowe & Russell, 1990: 8 (list; distribution); Burgess et al., 1991: 202 (colour fig.); Gill, 1993: 40 (distribution); Fosså & Nilsen, 1993: 127 (colour figs; sexual dimorphism; specific epithet misspelt "*novaehollandia*"); Lieske & Myers, 1994: pl. 33, fig. 6 (colour fig.; habitat and distribution); Kuiter, 1997: 59 (colour fig.; habitat and distribution); Allen, 1997: 96, pl. 29-18 (description; distribution; col. fig.); Gill, 1999b: 2561 (key).

DIAGNOSIS: *Ogilbyina novaehollandiae* is distinguished from congeners in having the following combination of characters: dorsal-fin rays III,34-38; circumpeduncular scales 22-25; lower gill rakers 10-12 (usually 11); and dorsal-fin origin to pelvic-fin origin 24.5-30.7 % SL. It is unique among pseudochromines in having the first dorsal-fin pterygiophore inserted either between the first and second neural spines or anterior to the first neural spine.

DESCRIPTION (based on 22 specimens, 34.2-71.2 mm SL): dorsal-fin rays III,34-38, last 9-18 segmented rays branched; anal-fin rays III,19-20, last 9-19 segmented rays branched; pectoral-fin rays 17-19; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 5-6; total caudal-fin rays 28-30; scales in lateral series 46-54; anterior lateral-line scales 40-46; anterior lateral line terminating beneath segmented dorsal-fin ray 26-32; posterior lateral-line scales 7-15 + 1-3; scales between lateral lines 4-5; horizontal scale rows above anal-fin origin 17-19 + 1 + 2-4 = 21-24; circumpeduncular scales 22-25; predorsal scales 18-27; scales behind eye 2-4; scales to preopercular angle 5-7; gill rakers 5-8 + 10-12 = 16-18; pseudobranch filaments 9-13; circumorbital pores 38-98; preopercular pores 14-33; dentary pores 4; posterior interorbital pores 0.

Lower lip complete; dorsal and anal fins with well-developed scale sheaths; predorsal scales extending anteriorly to point ranging from vicinity of mid AIO pores to anterior AIO pores; opercle with 3-7 small, indistinct serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or with well-developed teeth confined to raker tips; anterior dorsal-fin pterygiophore formula S + S + 3* + 1*/1*/1 + 1* + 1*/1 + 1* + 1*; dorsal-fin spines slender, tips weakly pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1 + 1*/1 + 1*/1 + 1*; anal-fin spines slender and weakly pungent to flexible, second spine about as stout as third; pelvic-fin spine slender, tip weakly pungent to flexible; second or third segmented pelvic-fin ray longest; caudal fin diamond-shaped or rounded, with middle rays ending in truncated point; vertebrae 10 + 16; epineurals 13-14; epurals 3.

Upper jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 5-7 (at symphysis) to 1-2 (on sides of jaw) irregular rows of small conical teeth, outermost of rows of teeth much larger and more curved than those of inner rows; lower jaw with 1-3 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1 (on sides of jaw) inner rows of small conical to caniniform teeth, those on middle of jaw large and caniniform; vomer with 10-13 rows of fine conical teeth arranged in triangular patch; palatine with 4-6 irregular rows of fine conical teeth arranged in ovoid patch, anterior part of tooth patch more-or-less contiguous with posterolateral edges of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 16 specimens, 34.2-71.2 mm SL): head length 21.3-26.5; orbit diameter 7.4-10.3; snout length 5.4-7.7; fleshy interorbital width 5.0-5.9; bony interorbital width 2.9-3.7; body width 10.6-12.9; snout tip to posterior tip of retroarticular bone 12.8-15.1; predorsal length 21.6-29.1; prepelvic length 28.0-35.2; posterior tip of retroarticular bone to pelvic-fin origin 15.6-22.5; dorsal-fin origin to pelvic-fin origin 24.5-30.7; dorsal-fin origin to middle dorsal-fin ray 35.1-40.7; dorsal-fin origin to anal-fin origin 43.9-47.5; pelvic-fin origin to anal-fin origin 25.2-30.4; middle dorsal-fin ray to dorsal-fin termination 30.6-34.1; middle dorsal-fin ray to anal-fin origin 26.0-28.8; anal-fin origin to dorsal-fin termination 37.4-41.6; anal-fin base length 30.7-36.5; dorsal-fin termination to anal-fin termination 14.2-17.3; dorsal-fin termination to caudal peduncle dorsal edge 7.3-8.6; dorsal-fin termination to caudal peduncle ventral edge 15.1-18.7; anal-fin termination to caudal peduncle dorsal edge 17.0-19.4; anal-fin termination to caudal peduncle ventral edge 8.2-9.9; first dorsal-fin spine 3.0-7.3; second dorsal-fin spine 4.9-7.7; third dorsal-fin spine 6.9-9.3; first segmented dorsal-fin ray 11.1-14.5; fourth last segmented dorsal-fin ray 18.4-22.4; first anal-fin spine 2.2-3.9; second anal-fin spine 4.1-5.7; third anal-fin spine 6.0-8.5; first segmented anal-fin ray 9.0-12.6; fourth last segmented anal-fin ray 16.3-20.7; third pectoral-fin ray 15.2-19.0; pelvic-fin spine 8.6-12.3; second segmented pelvic-fin ray 17.4-23.5; caudal-fin length 27.8-38.3.

Live coloration: Subadult females (based on photographs of specimens from the Keppel Ids, Heron Id and Wistari Reef, Queensland, and captive specimens; Plate 3A): dorsal contour of head and body yellowish grey to dark olive, remainder of head orange to bright red, becoming pale grey to pink ventrally; bright blue line extending around posteroventral rim of orbit along anteroventral edge of first infraorbital bone to dorsal part of lip edge; cheeks and operculum usually with blue to bright blue irregular markings; iris bright orange to bright red with dark blue suboval ring around pupil; upper part of flanks olive to bright yellow or bright orange, remainder of body pale pink to pearly white with series of short reddish brown to bright red oblique bars extending posteroventrally from posterior half of dorsal fin; dorsal fin dark olive to bright yellow or bright green anteriorly, becoming pale blue to hyaline posteriorly; fin usually with about six to 12 fine horizontal lines, these usually bright yellow to orange anteriorly, sometimes becoming bright red posteriorly, and tending to broaden toward basal part of fin; spinous portion of fin usually with elongate dark olive to dark grey spot; distal margin of fin bright blue, sometimes bordered proximally with bright red; anal fin pale pink to bright red, usually with six to 10 pale blue horizontal lines, these sometimes broken into series of spots; distal margin of fin bright blue; caudal fin pale blue or pink to bright red basally, becoming pale blue to bluish hyaline posteriorly, upper part of fin sometimes yellow; upper and lower margins of fin pale orange to bright red bordered distally with bright blue; pectoral fins pinkish hyaline to hyaline; pelvic fins pale pink to hyaline. Adult females (based on field notes on and photographs of a specimen from One Tree Id, Great Barrier Reef, and captive specimens): head and body dark grey to black; dark blue line extending around posteroventral rim of orbit along anteroventral edge of first infraorbital bone to dorsal part of upper lip edge, this bordered dorsally and ventrally with reddish brown to bright red; iris bright orange to bright red with dark blue suboval ring around pupil; posterior part of abdominal region orange, becoming bright red on ventral portion of body above anal fin; dorsal fin black with blue distal margin; anal fin reddish grey to bright red with bright blue distal margin, this bordered proximally with dark grey to

black; caudal fin black with upper and lower borders bright blue, these bordered submarginally with orange to bright red; pectoral fins hyaline; pelvic fins pale blue to grey. Subadult males (based on photographs of specimens from the Keppel Ids, Queensland, and captive specimens; Plate 3B): head and anterior part of body reddish brown to bright red; bright blue line extending around posteroventral rim of orbit along anteroventral edge of first infraorbital bone to dorsal edge of upper lip; cheeks and operculum with irregular blue to mauve markings; iris bright orange to bright red with dark blue suboval ring around pupil; body behind orange to red region olive to olive-grey, becoming paler ventrally, usually with series of short dark olive bars extending posteroventrally from posterior half of dorsal fin; dorsal fin bright green anteriorly, becoming dark green to bluish grey posteriorly, with five to 15 orange to bluish grey narrow stripes; distal margin of fin bright blue, this bordered proximally with bright yellow to bright red; spinous portion of fin sometimes with dark olive to dark grey horizontally elongate spot; anal fin olive to bluish or greenish hyaline, usually with six to 10 orange to bluish grey narrow stripes; distal margin of fin bright blue, this bordered proximally with bright orange to bright red; caudal fin olive to bluish or hyaline; upper and lower edges of fin bright blue, these bordered proximally with bright orange to crimson; pectoral fins pinkish hyaline to hyaline; pelvic fins pale blue to hyaline. Adult males (based on photographs of specimens from One Tree Id and Heron Id, Great Barrier Reef, field notes taken at One Tree Id and captive specimens; Plate 3C): similar to adult females except head and anterior part of body sometimes reddish grey, abdominal region and area above anal fin bluish grey to black, and anal fin black with blue distal margin.

Preserved coloration: Subadult females: pattern similar to live coloration, dorsal contour of head and anterior part of body becoming dusky grey, remainder of body pale yellowish brown; blue markings on head becoming grey to greyish brown; dorsal and anal fins becoming pale grey to greyish hyaline, darker posteriorly, horizontal lines on fins becoming pale grey to grey; dark spot on anterior part of dorsal fin becoming grey to dark grey; caudal fin pale brown to grey, becoming greyish to brownish hyaline posteriorly, pale orange to bright red and bright blue markings on upper and lower borders of fin becoming white to pale grey and grey, respectively; pectoral fins hyaline; pelvic fins pale grey to hyaline. Adult females: not seen but pattern probably similar to adult males. Subadult males: pattern similar to live coloration, head becoming brownish grey; mauve to blue markings on head becoming grey; body pale yellowish brown, becoming greyish brown on dorsal contour; dorsal fin becoming dark grey, horizontal lines becoming pale grey to grey; other fins as for subadult females. Adult males: head and body becoming greyish brown to dark grey; blue line on head becoming grey to dark grey; reddish brown to bright red areas on head becoming pale grey to pale brown; dorsal, anal and caudal fins becoming dark grey with pale grey distal margin; pectoral fins becoming dusky hyaline to hyaline; pelvic fins becoming pale grey to hyaline.

HABITAT AND DISTRIBUTION: *Ogilbyina novaehollandiae* is known only from the southern coast of Queensland and the Capricorn-Bunker Group, Great Barrier Reef (Figure 5). It has been collected and observed (pers. obs.) from tidal pools, lagoon patch reefs and reef slopes at depths ranging to 30 m.

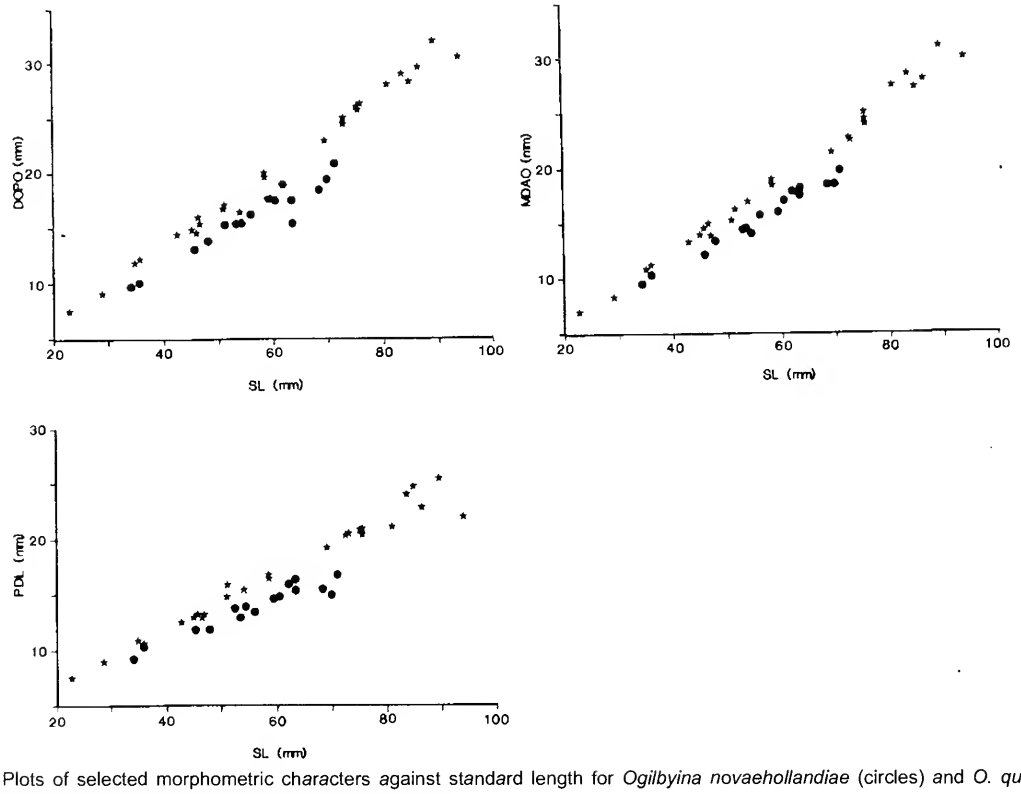

Figure 18. Plots of selected morphometric characters against standard length for *Ogilbyina novaehollandiae* (circles) and *O. queenslandiae* (stars). Abbreviations for morphometric characters follow Fig. 2.

COMPARISONS: This species has been confused in the past with *O. queenslandiae*. Although the live colourations of adult male and female *O. novaehollandiae* are distinctive, subadult females and subadult males of the species closely resemble females and males of *O. queenslandiae* in live coloration. The two species may still be readily distinguished. Subadult females of *O. novaehollandiae* differ from females of *O. queenslandiae* in having only the dorsal part of the head grey (versus most or all of the head), short reddish oblique bars present on the posterior part of the body (versus dark grey and on the anterior part of the body), and the lower part of the body pale pink to pearly white (versus bright yellow to bright red). Subadult males of *O. novaehollandiae* differ from males of *O. queenslandiae* in having the anterior portion of the dorsal fin bright green (versus usually reddish), and short dark oblique bars present on the posterior part of the body (versus on the anterior part). Despite considerable overlap in count ranges, the two species also differ in several meristic features. Most notably, *O. novaehollandiae* tends to have fewer lower-lobe gill rakers (10-12, modally 11 versus 11-13, modally 12) and scales below anterior lateral line (17-19 versus 18-23, usually 20-21) than *O. queenslandiae* (Appendix 1). The two species also differ in body shape; *O. novaehollandiae* tends to have a shallower body (dorsal-fin origin to pelvic-fin origin 24.5-30.7 % SL versus 31.9-35.8, middle dorsal-fin ray to anal-fin origin 26.0-28.8 % SL versus 28.8-34.6 % SL) and a shorter predorsal length (21.6-29.1 % SL versus 26.0-32.9 % SL) (Figure 18). Associated with the more forward placement of the dorsal fin in *O. novaehollandiae*, the two species also differ in dorsal-fin pterygiophore insertion patterns. Most notably, *Ogilbyina novaehollandiae* is unique among pseudochromids in having the first dorsal-fin pterygiophore inserted either between the first and second neural spines or anterior to the first neural spine whereas *O. queenslandiae* resembles other pseudochromines in having the first dorsal pterygiophore inserted between the second and third neural spines.

REMARKS: *Ogilbyina novaehollandiae* is a relatively large species; the largest specimen examined measured 71.2 mm SL. Determination of the ontogenetic and sexual coloration relationships described here are from observations of captive and wild pairs, and of maturing captive specimens. Live colour illustrations of subadult males are given by Coleman (1989), Gill (1990b) and Kuiter (1997), of subadult females by Burgess et al. (1988), Gill (1990b), Michael (1990b) and Fosså & Nilsen (1993: lower fig.), and of adult males by Coleman (1989), Michael (1990b; misidentified as *P. dilectus*) and Fosså & Nilsen (1993: upper fig.).

The holotype of *Dampieria longipinnis* Ogilby (1908) was examined, but its condition was too poor to allow scale or gill-raker counts or critical morphometric characters (including body depth measurements) to be taken accurately. However, a radiograph of the specimen revealed a typical *O. novaehollandiae* dorsal-fin pterygiophore insertion pattern. Furthermore, Ogilby mentioned two specimens from the type locality that he stated were conspecific with the holotype. These specimens, which are now in QM I.791 (along with an additional specimen), are in relatively good condition and are clearly referable to the present species.

ETYMOLOGY: The specific name *novaehollandiae* is for New Holland (= Australia).

MATERIAL EXAMINED: QUEENSLAND, AUSTRALIA: Port Denison, SMNS 1859, 1(1), 63.4 mm SL (holotype of *P. novaehollandiae* Steindachner); Bowen, QM I.781, 1(1), 62.5 mm SL (holotype of *D. longipinnis* Ogilby), QM I.791, 3(3), 47.5-69.2 mm SL; Keppel Ids, AMS I.32003-001, 5(5), 53.6-71.2 mm SL; Keppel Ids, Great Keppel Id, AMS I.19347-001, 1(1), 58.2 mm SL (cleared and stained); Capricorn-Bunker Group, Masthead Id, AMS I.7089-91, 3(3), 56.2-62.2 mm SL; Capricorn-Bunker Group, Wistari Reef, BPBM 14531, 2(2), 34.2-35.8 mm SL; Capricorn-Bunker Group, Heron Id, BMNH 1979.1.9.15-17, 3(3), 45.4-52.5 mm SL; Capricorn-Bunker Group, One Tree Id, AMS I.18280-001, 1(1), 48.5 mm SL (cleared and stained), AMS I.20577-007, 1(1), 63.3 mm SL, QM I.21377, 1(1), 68.6 mm SL.

Ogilbyina queenslandiae (Saville-Kent)

Queensland Dottyback

Figures 4A, 13, 18; Plates 3D-E

Polyacanthus queenslandiae Saville-Kent, 1893: 308, pl. 16, fig. 8 (type locality: Adolphus Id, Torres Strait Ids).

Klunzingerina novae-hollandiae [*non Pseudochromis novaehollandiae* Steindachner, 1880]; Fowler, 1957: 67 (Lady Musgrave Id, Queensland).

Pseudochromis (Pseudochromis) novae-hollandiae [*non* Steindachner, 1880]; Marshall, 1957: 120 (Palm Ids, Queensland).

Ogilbyina longipinnis [*non Dampieria longipinnis* Ogilby, 1908]; Woodland & Slack-Smith, 1963: 30 (Heron Id, Queensland).

Pseudochromis novae-hollandiae [*non* Steindachner, 1880]; Grant, 1972: 186, colour pl. 31; Grant, 1987: 150, fig. 346.

Pseudochromis longipinnis [*non Dampieria longipinnis* Ogilby, 1908]; Russell, 1983: 44 (Capricorn-Bunker Group, Queensland); Burgess et al., 1988: pl. 152 (colour fig.).

Dampieria longipinna [*non* Ogilby, 1908]; Godkin & Winterbottom, 1985: 635 (osteology).

Pseudochromis queenslandiae; Paxton et al., 1989: 520 (list; distribution; not synonymy).

Ogilbyina queenslandiae; Gill, 1990b: 125 (description; distribution; sexual dimorphism; colour figs); Lowe & Russell, 1990: 8 (list; distribution; not synonymy); Gill, 1993: 40 (colour figs; sexual dimorphism; habitat and distribution); Lieske & Myers, 1994: pl. 33, fig. 7 (colour fig.; habitat and distribution); Allen, 1997: 96, pl. 29-19 (description; distribution; col. fig.); Gill, 1999b: 2572 (description; distribution; fig.).

DIAGNOSIS: *Ogilbyina queenslandiae* is distinguished from congeners in having the following combination of characters: dorsal-fin rays III-IV,32-37 (usually III,34-36), circumpeduncular scales 24-26, lower gill rakers 11-13 (usually 12), and dorsal-fin origin to pelvic-fin origin 31.9-35.8 % SL. It is also distinctive in having an anterior dorsal-fin pterygiophore formula of S + S*//3 + 1 + 1 + 1*/1 + 1 + 1*.

DESCRIPTION (based on 34 specimens, 22.0-97.2 mm SL): dorsal-fin rays III-IV,32-37, last 2-19 segmented rays branched;

anal-fin rays III,18-21, last 2-19 segmented rays branched; pectoral-fin rays 18-20; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 5-6; total caudal-fin rays 28-30; scales in lateral series 46-56; anterior lateral-line scales 38-50; anterior lateral line terminating beneath segmented dorsal-fin ray 23-30; posterior lateral-line scales 4-18 + 0-3; scales between lateral lines 5-7; horizontal scale rows above anal-fin origin 18-23 + 1 + 3-5 = 22-28; circumpeduncular scales 24-26; predorsal scales 20-32; scales behind eye 2-4; scales to preopercular angle 5-8; gill rakers 5-8 + 11-13 = 16-20; pseudobranch filaments 9-18; circumorbital pores 18-110; preopercular pores 13-45; dentary pores 4-5; posterior interorbital pores 0-1.

Lower lip complete; dorsal and anal fins with well-developed scale sheaths; predorsal scales extending anteriorly to point ranging from mid AlO pores to midway between anterior AlO and posterior nasal pores; opercle with 3-7 small, indistinct serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or with well-developed teeth confined to distal halves or tips of rakers; anterior dorsal-fin pterygiophore formula S + S*//3 + 1 + 1 + 1*/1 + 1 + 1*; dorsal-fin spines moderately slender to slender, tips moderately pungent to flexible; anterior anal-fin pterygiophore formula 3 + 1*/1 + 1*/1 + 1*; anal-fin spines moderately slender to slender and moderately pungent to flexible, second spine about as stout as third; pelvic-fin spine moderately slender to slender, tip moderately pungent to flexible; second or third segmented pelvic-fin ray longest; caudal fin rounded, posterior margin varying from truncate to irregular, sometimes with upper or middle rays elongate; vertebrae 10 + 16; epineurals 12-14; epurals 3.

Upper jaw with 1-3 pairs of curved, enlarged caniniform teeth anteriorly, and 5-7 (at symphysis) to 1-2 (on sides of jaw) irregular rows of small conical teeth, outermost of rows of teeth much larger and more curved than those of inner rows; lower jaw with 1-3 pairs of curved, enlarged caniniform teeth anteriorly, and 6-7 (at symphysis) to 1 (on sides of jaw) inner rows of small conical to caniniform teeth, those on middle of jaw large and caniniform; vomer with 7-14 rows of fine conical teeth arranged in triangular patch; palatine with 3-5 irregular rows of fine conical teeth arranged in ovoid patch, anterior part of tooth patch more-or-less contiguous with posterolateral edges of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 27 specimens, 22.8-97.2 mm SL): head length 22.9-29.4; orbit diameter 6.9-11.8; snout length 5.7-8.1; fleshy interorbital width 5.3-7.0; bony interorbital width 3.1-5.3; body width 12.5-14.5; snout tip to posterior tip of retroarticular bone 13.6-16.7; predorsal length 25.5-32.9; prepelvic length 31.6-35.5; posterior tip of retroarticular bone to pelvic-fin origin 18.4-22.3; dorsal-fin origin to pelvic-fin origin 31.9-35.8; dorsal-fin origin to middle dorsal-fin ray 36.0-44.0; dorsal-fin origin to anal-fin origin 45.7-50.6; pelvic-fin origin to anal-fin origin 23.3-29.1; middle dorsal-fin ray to dorsal-fin termination 28.4-32.7; middle dorsal-fin ray to anal-fin origin 28.8-35.2; anal-fin origin to dorsal-fin termination 39.1-43.7; anal-fin base length 32.5-38.3; dorsal-fin termination to anal-fin termination 15.1-17.4; dorsal-fin termination to caudal peduncle dorsal edge 6.3-8.8; dorsal-fin termination to caudal peduncle ventral edge 16.1-18.9; anal-fin termination to caudal peduncle dorsal edge 17.3-19.7; anal-fin termination to caudal peduncle ventral edge 8.4-10.7; first dorsal-fin spine 3.1-5.0; second dorsal-fin spine 3.6-7.1; third dorsal-fin spine 6.3-10.4; first segmented dorsal-fin ray 10.1-19.2; fourth last segmented dorsal-fin ray 18.4-32.0; first anal-fin spine 2.2-4.3; second anal-fin spine 4.4-6.5; third anal-fin spine 6.8-9.4; first segmented anal-fin ray 10.3-14.1; fourth last segmented anal-fin ray 16.0-26.8; third pectoral-fin ray 14.6-20.0; pelvic-fin spine 9.4-12.5; second segmented pelvic-fin ray 21.0-28.3; caudal-fin length 26.4-52.6.

Live coloration: Females (based on photographs of specimens from One Tree Id and Lady Musgrave Id, Great Barrier Reef, field notes taken from specimens at One Tree Id and captive specimens; Plate 3D): head and anterior part of body dark greyish brown to dark bluish grey, this sometimes extending along dorsal contour of body to caudal peduncle; scales within dark brown to dark grey region each with darker central spot; blue line extending around posteroventral edge of orbit along ventral margin of first infraorbital bone to middle of upper lip; iris bright orange to dark reddish brown with dark blue suboval ring around pupil; abdominal region of body behind and below dark brown to dark grey area bright yellow to bright orange, this usually becoming bright red to crimson posteriorly above anal fin and on at least ventral half of caudal peduncle; series of short dark grey oblique bars extending posteroventrally from anterior half of dorsal-fin base onto edges of bright yellow to bright orange region of body; dorsal fin dark olive-grey to dark bluish grey anteriorly, usually becoming brownish grey to bright red posteriorly, with three to eight reddish grey to red narrow stripes on distal half of fin; spinous portion of fin sometimes with dark grey to black horizontally elongate spot; distal edge of fin bright blue to bluish grey, bordered submarginally with reddish brown to bright red; anal fin reddish brown to crimson with three to six yellowish grey to bluish grey stripes, these becoming broader distally on fin; distal margin of fin bright blue to bluish grey; caudal fin base similar to adjacent caudal peduncular coloration, becoming reddish grey to grey or hyaline posteriorly, usually with upper and/or lower borders of fin bright yellow; distal margin of fin sometimes bright blue to bluish grey, lower lobe sometimes bordered submarginally with red; pectoral fins bright yellow to yellowish hyaline, fin bases usually dark grey at least dorsally; pelvic fins pale pink to greyish yellow or hyaline. Males (based on photographs of specimens from Lizard Id and One Tree Id, Great Barrier Reef, field notes taken from specimens at One Tree Id and captive specimens; Plate 3E): head and anterior part of body reddish brown to bright orange-yellow or crimson; blue line extending around posteroventral rim of orbit along anteroventral edge of first infraorbital bone to middle edge of upper lip; iris bright orange to reddish brown with blue to turquoise suboval ring around pupil; body behind yellow or reddish anterior region varying from pale bluish grey through pale olive to dark bluish grey; scales of head and body often with dark reddish brown to dark blue central spots; series of short dark olive to dark grey bars extending posteroventrally from dorsal-fin base to middle of flanks sometimes present, these becoming less distinct posteriorly; anterior part of dorsal fin bright yellow-green to reddish brown or bright red, remainder of fin yellow to olive or dark grey, usually with series of about 5-15 bright

blue to dark grey narrow stripes; spinous portion of fin usually with horizontally elongate dark grey to black spot; distal edge of fin usually bright blue to dark grey bordered proximally with yellow to red; anal fin pale grey to dark bluish grey, usually with 4-10 olive to red or dark grey narrow stripes; distal margin of fin similar to dorsal fin; caudal fin grey to dark grey basally, becoming grey to greyish hyaline posteriorly, sometimes with upper and lower borders of fin broadly yellow; distal margin usually bright blue to bluish grey, bordered submarginally on lower lobe with reddish grey to bright red; pectoral fins bright yellow or orange to yellowish hyaline, fin bases usually red to dark grey; pelvic fins pale pink to pale blue or hyaline, sometimes with 5-6 rows of small orange spots and streaks.

Preserved coloration: Females: pattern similar to live coloration, head and anterior part of body becoming brown to greyish brown; dark spots on scales becoming brown to dark greyish brown; blue stripe around eye becoming dark greyish brown; remainder of body becoming pale brown; grey oblique bars becoming grey to brown; dorsal fin becoming brown to dark grey-brown, usually with dusky grey spot on spinous portion of fin and several indistinct grey stripes posteriorly; anal fin brown to brownish hyaline, usually with several grey stripes; caudal fin dark brown basally becoming brownish hyaline posteriorly, usually with upper and lower margins pale yellow to pale brown; pectoral fins pale brownish hyaline to hyaline; pelvic fins pale brown to hyaline. Males: pattern similar to female preserved coloration, except head and anterior part of body pale yellowish brown to pale brown without oblique bars, and posterior part of body sometimes with brown to dark brown spots on scale centres.

HABITAT AND DISTRIBUTION: *Ogilbyina queenslandiae* is known only from the coast of Queensland and the Great Barrier Reef, from Adolphus Id south to Gladstone (Figure 13). It has been observed (pers. obs.) and collected from tidal pools and lagoon patch reefs around rock and coral reefs and coral rubble at depths ranging to 15 m.

COMPARISONS: This species has been confused in the past with *O. novaehollandiae*; characters distinguishing the two species are discussed under *Comparisons* for *O. novaehollandiae*. The following characters in combination distinguish it from congeners and all other pseudochromines: dorsal-fin rays III-IV,32-37 (usually III,34-36); circumpeduncular scales 24-26; and lower lip complete.

REMARKS: *Ogilbyina queenslandiae* is a relatively large species; the largest specimen examined measured 97.2 mm SL. As noted above, this species is sexually dichromic. The female colour form has been illustrated by Burgess et al. (1988; 1991) and Gill (1990b; 1993), and the male colour form has been illustrated by Gill (1990b; 1993).

The population ecology and reproductive biology of *O. queenslandiae* has recently been studied at One Tree Id, southern Great Barrier Reef by Ferrell (1987). His studies of sex/coloration relationships confirm the sexual dimorphism noted above. He also noted that 5-10 % of the population at any one time had a third coloration intermediate between the male and female colourations; these were sex-changing individuals that adopted either male or female colourations within a period of a few months (up to seven months in one individual). He found that most juvenile fishes were of the male coloration and that the species mainly changed sex from male to female (protandry), although infrequent female to male sex change (protogyny) was also noted. However, he found no significant differences in size for the two sexes. Since the populations observed by him had 1:1 sex ratios with strong evidence of pair bonding, he suggested that sex change was socially determined and associated with maintenance of this sex ratio, and that delayed sex change (as shown by the relatively long period of transitional coloration) may be a strategy for assuring unpaired individuals to adopt the appropriate sex for reproductive recruitment.

A pair of captive specimens maintained during the present study were observed spawning. Eggs were laid approximately every two weeks and were cared for by the male in a small cave within his territory. The eggs were initially in a tight, ball-shaped mass similar to that described by Lubbock (1975) for *Pseudochromis flavivertex*, but this later became more-or-less amorphous as the eggs became more loosely associated with each other. The male periodically picked the egg-ball up in his mouth and moved it to various positions within the cave. This continued for two to three days after spawning until it was attached permanently to the ceiling of the cave. The eggs hatched six to seven days after laying and the larvae immediately left the cave and received no additional care from the male.

This species has a confused nomenclatural history. It has generally been referred to either as *Pseudochromis novaehollandiae* Steindachner (1880) or *Dampieria longipinnis* Ogilby (1908) or under various generic combinations of these names. However, these two nominal species are conspecific and refer to a different taxon (see *Remarks* for *O. novaehollandiae*).

According to the original description, the holotype of *Polyacanthus queenslandiae* Saville-Kent (1893) was lost soon after it had been illustrated. Although McCulloch (1915) placed *P. queenslandiae* in the synonymy of *Pseudochromis novaehollandiae* Steindachner, Saville-Kent's figure is clearly based on a male of the present species. Furthermore, the type locality of *P. queenslandiae* (Adolphus Id, Torres Strait Ids) is well outside the known distributional range of *O. novaehollandiae*. In order to stabilize the nomenclature of the species, a 46.8 mm SL specimen from Sir Charles Hardy Id, AMS I.20770-119, is here designated as the neotype.

ETYMOLOGY: The specific epithet refers to the Australian state of Queensland.

MATERIAL EXAMINED: QUEENSLAND, AUSTRALIA: Sir Charles Hardy Id, NE corner of South Id, AMS I.20770-119, 1(1), 46.8 mm SL (neotype), AMS I.20770-123, 4(4), 42.7-46.5 mm SL; Lizard Id, AMS I.23708-052, 1(1), 29.8 mm SL; Lizard Id, North Point, BMNH 1983.3.25.189, 1(1), 48.2 mm SL; Little Hope Id, ANSP 167777, 1(1), 35.1 mm SL; Endeavour Reef, ANSP 121894, 1(1), 58.5 mm SL, ANSP 121895, 1(1), 36.1 mm SL; Palm Id, QM I.12198, 2(2), 75.7-80.9 mm SL; Capricorn-Bunker Group, North West Id, AMS I.15960-001, 1(1), 94.0 mm SL; Capricorn-Bunker Group, Heron Id, CSIRO B.1314, 10(0), 33.5-80.5 mm SL, QM I.9754, 1(0), 53.0 mm SL; Capricorn-Bunker Group,

One Tree Id, AMS I.15624-022, 11(7, 58.3-85.5 mm SL), 50.0-90.0 mm SL, AMS I.17445-009, 8(5, 51.0-89.4 mm SL), 51.0-89.4 mm SL, AMS I.27782-003, 3(2, 22.8-28.8 mm SL), 16.5-28.8 mm SL, AMS uncat., 1(1), 22.0 mm SL, AMS uncat., 2(2), 74.1-82.9 mm SL; Capricorn-Bunker Group, One Tree Id, W channel, AMS I.20948-002, 7(4, 51.3-75.6 mm SL), 39.8-75.6 mm SL, AMS I.20948-032, 1(1), 89.7 mm SL (subsequently cleared and stained), QM I.11726, 1(1), 83.4 mm SL; Capricorn-Bunker Group, Lady Musgrave Id, BMNH 1983.3.25.262, 1(1), 97.2 mm SL; Gladstone, MCZ 36840, 4(4), 54.1-84.9 mm SL.

Ogilbyina salvati (Plessis & Fourmanoir)

Freckled Dottyback

Figure 13; Plates 3F-G

Pseudochromis novaehollandiae [*non* Steindachner, 1880]; Catala, 1950: 266, 304 (Ile aux Canards, New Caledonia).

Pseudochromis salvati Plessis & Fourmanoir, 1966: 227, 1 unnumbered fig. (type locality: Maitre Id, Nouméa, New Caledonia); Fourmanoir & Laboute, 1976: 285 (colour fig.); Bauchot & Desoutter, 1986: 87 (list).

Ogilbyina salvati; Gill, 1993: 40 (distribution); Gill, 1999b: 2561 (key).

DIAGNOSIS: *Ogilbyina salvati* is distinguished from congeneric species in having: circumpeduncular scales 19-20; scales above anal-fin origin 14-16 + 1 + 2-3 = 17-20; and dark brown (bright blue in life) spots on the cheek, operculum, pectoral-fin base and breast.

DESCRIPTION (based on 23 specimens, 25.9-57.5 mm SL): dorsal-fin rays III,31-34, last 8-29 segmented rays branched; anal-fin rays III,19-21, last 7-21 segmented rays branched (all or all but first 1-2 segmented rays branched in specimens larger than 40 mm SL); pectoral-fin rays 18-19; upper procurrent caudal-fin rays 6; lower procurrent caudal-fin rays 5-6; total caudal-fin rays 28-29; scales in lateral series 43-48; anterior lateral-line scales 38-44; anterior lateral line terminating beneath segmented dorsal-fin ray 23-28; posterior lateral-line scales 5-14 + 0-2; scales between lateral lines 4-6; horizontal scale rows above anal-fin origin 14-16 + 1 + 2-3 = 17-20; circumpeduncular scales 19-20; predorsal scales 14-20; scales behind eye 2; scales to preopercular angle 4-6; gill rakers 4-7 + 10-12 = 15-19; pseudobranch filaments 8-11; circumorbital pores 24-55; preopercular pores 14-24; dentary pores 5-9; posterior interorbital pores 0.

Lower lip complete with median v-shaped notch; dorsal and anal fins with well-developed scale sheaths; predorsal scales extending anteriorly to mid AIO pores; opercle with 3-7 small, inconspicuous serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or with well-developed teeth confined to raker tips; anterior dorsal-fin pterygiophore formula S/S + (S^v)/3 + 1/1 + 1 + 1*/1/1; dorsal-fin spines slender, the tips weakly pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1 + 1/1 + 1*; anal-fin spines slender and weakly pungent to flexible, second spine varying from about as stout as to less stout than third spine; pelvic-fin spine slender, tip weakly pungent to flexible; second segmented pelvic-fin ray longest; caudal fin rounded with posterior margin varying from truncate to irregular with upper and/or lower lobes produced; vertebrae 10 + 16; epineurals 13-14; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 5-7 (at symphysis) to 2 (on sides of jaw) irregular rows of small conical teeth, outermost of rows of teeth much larger and more curved than those of inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1 (on sides of jaw) inner rows of small conical to caniniform teeth, those on middle of jaw large and caniniform; vomer with 8-12 rows of fine conical teeth arranged in triangular patch; palatine with 3-5 irregular rows of fine conical teeth arranged in ovoid patch, anterior part of tooth patch more-or-less contiguous with posterolateral edges of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 17 specimens, 25.9-57.5 mm SL): head length 23.1-27.8; orbit diameter 8.0-11.2; snout length 5.6-6.9; fleshy interorbital width 5.3-6.5; bony interorbital width 2.7-3.9; body width 12.6-14.2; snout tip to posterior tip of retroarticular bone 12.5-14.7; predorsal length 28.1-33.1; prepelvic length 32.2-36.3; posterior tip of retroarticular bone to pelvic-fin origin 20.9-25.7; dorsal-fin origin to pelvic-fin origin 30.9-33.2; dorsal-fin origin to middle dorsal-fin ray 35.5-41.1; dorsal-fin origin to anal-fin origin 41.9-44.6; pelvic-fin origin to anal-fin origin 20.7-26.8; middle dorsal-fin ray to dorsal-fin termination 27.3-31.6; middle dorsal-fin ray to anal-fin origin 29.6-32.5; anal-fin origin to dorsal-fin termination 39.8-44.5; anal-fin base length 31.5-38.2; dorsal-fin termination to anal-fin termination 15.1-16.8; dorsal-fin termination to caudal peduncle dorsal edge 7.0-8.7; dorsal-fin termination to caudal peduncle ventral edge 16.0-18.2; anal-fin termination to caudal peduncle dorsal edge 17.0-20.5; anal-fin termination to caudal peduncle ventral edge 8.9-10.6; first dorsal-fin spine 3.0-4.8; second dorsal-fin spine 4.3-7.6; third dorsal-fin spine 6.7-9.7; first segmented dorsal-fin ray 11.2-16.9; fourth last segmented dorsal-fin ray 17.3-24.7; first anal-fin spine 1.9-4.6; second anal-fin spine 4.5-6.3; third anal-fin spine 6.7-8.1; first segmented anal-fin ray 9.7-13.3; fourth last segmented anal-fin ray 14.7-19.4; third pectoral-fin ray 15.1-18.9; pelvic-fin spine 10.0-12.3; second segmented pelvic-fin ray 22.2-28.8; caudal-fin length 24.3-29.4.

Live coloration: Females (based on photographs of specimens from Nouméa; Plate 3F): head and body dark brown, becoming beige ventrally, and pale pink on ventral part of head, pectoral-fin base and posterior part of abdomen; posteroventral margin of orbit with a dark grey to black bar, this bordered posteriorly by a pale to bright blue line, line curving below orbit along infraorbitals to dorsal part of upper lip; margin of orbit inside dark grey to black bar and blue line bright yellow to yellowish brown; upper part of cheeks and operculum yellowish brown to bright yellow; large, irregular bright blue to dark purple spots on cheeks, operculum, pectoral base and breast; iris orange-red, with two oblique blue lines, one above and one below pupil; posterior part of body and caudal peduncle becoming yellowish brown to bright yellow; dorsal fin bright red or reddish brown anteriorly, becoming brownish grey to bright yellow posteriorly; outer third to half of fin with two to four blue stripes, these broken into series of spots anteriorly and proximally; distal margin of fin blue, bordered proximally with bright red; anal fin pale pinkish grey,

becoming yellowish brown to bright yellow posteriorly, with two to five blue stripes or rows of spots; distal margin of fin bluish grey, bordered with reddish grey; caudal fin bright yellow, bordered distally with reddish to greyish hyaline; pectoral fins yellowish to brownish hyaline; pelvic fins pale pink to pinkish grey, with two to four rows of small reddish brown on middle of fins. Males [based on colour fig. in Fourmanoir & Laboute (1976), field notes taken by R. Lubbock from two specimens from Nouméa, field observations of specimens in Nouméa, and colour photographs of specimens from Nouméa; Plate 3G]: body pale pinkish orange to reddish grey or bright orange, darker dorsally, becoming pinkish orange to orangish grey or bright orange on head, paler ventrally; posteroventral margin of orbit with dark grey to black bar, this bordered posteriorly by pale to bright blue line, line curving below orbit along infraorbitals to dorsal part of upper lip; large, irregular bright blue to dark purple or black spots on cheeks, operculum, pectoral base and breast; iris bright red with two oblique dark blue lines, one above and one below pupil; caudal peduncle sometimes becoming bright orange-yellow; dorsal and anal fins reddish grey to bright red, sometimes becoming bright yellow posteriorly, and sometimes with five to seven faint bluish grey to bright blue stripes and bright blue to grey distal margin; caudal fin bright yellow, sometimes becoming greyish to reddish hyaline posteriorly, and sometimes with narrow bright blue upper and lower margins; pectoral fins pinkish to greyish hyaline; pelvic fins greyish to reddish hyaline, sometimes with five or six rows of bluish to reddish grey spots forming broken bands.

Preserved coloration: head and body brown to dark brown, paler ventrally; dark brown line extending around posteroventral rim of orbit to mid upper lip; blue spots on cheek, operculum, pectoral base and breast becoming dark brown; dorsal fin dusky to dark brown with several rows of short dark brown streaks and spots distally; anal fin pale brown to brown with several rows of short dark brown streaks and spots distally; caudal fin usually pale brown with mid basal dusky brown blotch on each lobe; pectoral fins hyaline; pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Ogilbyina salvati* is known only from the vicinity of Nouméa, southern New Caledonia (Figure 13). It has been collected from around coral rubble, patch reefs, rocks and coral heads in tidal pools and shallow lagoon areas at depths ranging to 5 m.

COMPARISONS: This species is relatively distinctive and unlikely to be confused with other pseudochromines. The combination of III,31-34 dorsal-fin rays, 19-21 segmented anal-fin rays, 19-20 circumpeduncular scales, and a complete lower lip is unique within the subfamily. The presence of conspicuous bright blue spots on the cheek, operculum, pectoral-fin base and breast are also diagnostic for the species; these become dark brown and persist following long preservation.

REMARKS: *Ogilbyina salvati* is a moderate-sized pseudochromine; the largest specimen examined measured 61.8 mm SL. A live colour illustration of the species is provided by Fourmanoir & Laboute (1976).

ETYMOLOGY: The specific epithet is for Dr B. Salvat.

MATERIAL EXAMINED: NEW CALEDONIA: MNHN 1980-1016, 19(17, 25.9-57.3 mm SL), 20.8-57.3 mm SL, MNHN 1980-1045, 21(1, 59.0 mm SL, cleared and stained); Nouméa, Maitre Id, MNHN 1966-736, 1(1), 51.0 mm SL (holotype); Nouméa, Ducos Peninsula, USNM 278149, 14(0), USNM 278152, 3(0), USNM 290682, 8(0); Nouméa, Anse Vata, AMS IB.2236, 1(1), 49.3 mm SL, BPBM 27155, 8(4, 48.8-57.2 mm SL), 26.4-57.2 mm SL, Nouméa, S of Anse Vata, USNM 290091, 2(0); Nouméa Harbour, USNM 290337, 3(0); Nouméa, near Camp Goetige, 25(0); Nouméa, Ile aux Canards, BMNH 1983.3.25.237, 2(0); Nouméa, Pointe Cluxel, USNM 319819, 6(0), 44.0-61.8 mm SL; Nouméa, Isle Nou, USNM 319823, 3(0), 44.0-47.4 mm SL.

OXYCERCICHTHYS gen. nov.

TYPE SPECIES: *Pseudochromis veliferus* Lubbock

DIAGNOSIS: *Oxycercichthys* is distinguished from other pseudochromine genera in having the following combination of characters: dorsal-fin rays II,25-26; segmented anal-fin rays 16; scales in lateral series 46-50; dorsal and anal fins without well-developed scale sheaths; and lower lip complete. Osteologically it is distinct in having in combination an anterior dorsal-fin pterygiophore formula of $S^*/S + S^v/3/1 + 1/1/1/1/1/1/1/1/1/1/1/1 + 1^*/1/1 + 1/1 + 1$ and 10 + 16 vertebrae.

REMARKS: Under my advice, several recent authors have placed *Pseudochromis veliferus* Lubbock, the only species included here in *Oxycercichthys*, in the genus *Ogilbyina*. My subsequent studies indicate that the species is not closely related to *Ogilbyina*, and it is instead placed in its own genus. *Oxycercichthys* was referred to as 'new genus B' by Gill, Leis & Rennis (2000). Characters distinguishing *Ogilbyina* and *Oxycercichthys* are given under *Remarks* for *Ogilbyina*. The presence of II,25-26 rays in the dorsal fin distinguishes *Oxycercichthys* from almost all other pseudochromines. The only other pseudochromine genus with two dorsal-fin spines is *Labracinus*, which differs markedly from *Oxycercichthys* in having, for example, fewer segmented anal-fin rays (13-15, rarely 13 or 15 versus 16), well-developed scale sheaths present on the dorsal and anal fins (absent in *Oxycercichthys*), and more anterior lateral-line scales (43-67 versus 30-39).

When present (i.e., in non-juvenile specimens), the distinctive caudal-fin shape, with the middle rays highly elongate, also allows ready identification of the genus. Only two other pseudochromines have the middle caudal-fin rays elongate, *Pseudochromis pictus* and *P. reticulatus*. They are readily distinguished from *Oxycercichthys* in having, for example, an incomplete (versus complete) lower lip, three (versus two) dorsal-fin spines, 33-38 (versus 46-50) scales in lateral series, and fewer circumpeduncular scales (20 in *P. pictus* and 16 in *P. reticulatus* versus 22-24, usually 24, in *O. veliferus*).

ETYMOLOGY: The generic epithet is a combination of the Greek *oxys*, sharp, *kerkos*, tail, and *ichthys*, fish, and alludes to the distinctive caudal-fin shape. The gender is masculine.

***Oxycercichthys veliferus* (Lubbock)**
Spiketail Dottyback
Figure 7; Plates 3H-I

Pseudochromis veliferus Lubbock, 1980: 831, fig. 5 (type locality: North Point, Lizard Id, Great Barrier Reef, Australia); Russell, 1983: 45 (One Tree Id, Queensland); Burgess et al., 1988: pl. 151 (lower right colour fig.); Paxton et al., 1989: 521 (list; distribution); Gill, 1999b: 2562 (key).

Ogilbyina velifera; Gill, 1990b: 126 (description; distribution; colour figs); Lowe & Russell, 1990: 8 (list; distribution); Burgess et al., 1991: 201 (colour fig.); Kuiter, 1992: 43, fig. d (colour fig.; habitat and distribution); Gill, 1993: 40 (distribution); Fossų & Nilsen, 1993: 129 (colour fig.; habitat and distribution); Lieske & Myers, 1994: pl. 33, fig. 8 (colour fig.; habitat and distribution); Allen, 1997: 96, pl. 29-20 (description; distribution; col. fig.); Gill, 1997: 126 (description; colour figs).

DIAGNOSIS: As for genus.

DESCRIPTION (based on 18 specimens, 32.5-85.5 mm SL): dorsal-fin rays II,25-26, last 7-12 segmented rays branched; anal-fin rays III,16, last 7-16 segmented rays branched; pectoral-fin rays 17-18; upper procurrent caudal-fin rays 6; lower procurrent caudal-fin rays 5-6; total caudal-fin rays 28-29; scales in lateral series 46-50; anterior lateral-line scales 30-39; anterior lateral line terminating beneath segmented dorsal-fin ray 13-18; posterior lateral-line scales 6-13 + 0-2; scales between lateral lines 4-6; horizontal scale rows above anal-fin origin 17-20 + 1 + 2-4 = 20-24; circumpeduncular scales 22-24; predorsal scales 16-25; scales behind eye 2-4; scales to preopercular angle 5-7; gill rakers 5-7 + 10-12 = 15-19; pseudobranch filaments 9-12; circumorbital pores 23-44; preopercular pores 13-23; dentary pores 4-5; posterior interorbital pores 0.

Lower lip complete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of posterior AIO to anterior AIO pores; opercle with 4-6, usually indistinct serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed, or with well-developed teeth confined to raker tips; anterior dorsal-fin pterygiophore formula S*/S + S^{v}/3/1 + 1/1/1/1/1/1/1/1/1/1/1/1 + 1*/1/1 + 1/1 + 1; dorsal-fin spines slender, tips weakly pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1/1/1/1 + 1*/1; anal-fin spines slender and weakly pungent to flexible, second spine about as stout or slightly less stout than third; pelvic-fin spine slender, tip weakly pungent to flexible; second segmented pelvic-fin ray longest; caudal fin rounded in small specimens, with middle rays becoming highly elongate in large specimens; vertebrae 10 + 16; epineurals 13; epurals 3.

Upper jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1-2 (on sides of jaw) irregular rows of small conical teeth, outermost of rows of teeth much larger and more curved than those of inner rows; lower jaw with 1-3 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical to caniniform teeth, those on middle of jaw large and caniniform; vomer with 2-4 rows of small conical teeth arranged in chevron; palatine with 3-4 irregular rows of small conical teeth arranged in ovoid patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 15 specimens, 32.5-85.5 mm SL): head length 21.5-27.4; orbit diameter 7.1-10.8; snout length 6.5-8.1; fleshy interorbital width 4.6-5.5; bony interorbital width 2.9-3.7; body width 9.9-12.6; snout tip to posterior tip of retroarticular bone 13.0-16.3; predorsal length 27.9-32.6; prepelvic length 31.3-33.1; posterior tip of retroarticular bone to pelvic-fin origin 17.4-20.3; dorsal-fin origin to pelvic-fin origin 26.9-30.5; dorsal-fin origin to middle dorsal-fin ray 38.2-44.2; dorsal-fin origin to anal-fin origin 42.5-45.9; pelvic-fin origin to anal-fin origin 25.0-31.1; middle dorsal-fin ray to dorsal-fin termination 25.0-28.4; middle dorsal-fin ray to anal-fin origin 26.9-29.2; anal-fin origin to dorsal-fin termination 36.6-39.7; anal-fin base length 30.5-34.2; dorsal-fin termination to anal-fin termination 14.8-16.2; dorsal-fin termination to caudal peduncle dorsal edge 7.7-9.7; dorsal-fin termination to caudal peduncle ventral edge 16.2-18.3; anal-fin termination to caudal peduncle dorsal edge 17.3-20.3; anal-fin termination to caudal peduncle ventral edge 8.8-11.2; first dorsal-fin spine 6.1-9.2; second dorsal-fin spine 9.1-12.2; first segmented dorsal-fin ray 14.0-18.0; fourth last segmented dorsal-fin ray 21.2-29.2; first anal-fin spine 1.8-4.0; second anal-fin spine 3.6-5.4; third anal-fin spine 6.8-10.2; first segmented anal-fin ray 10.7-13.2; fourth last segmented anal-fin ray 14.5-27.1; third pectoral-fin ray 16.8-18.8; pelvic-fin spine 8.2-11.5; second segmented pelvic-fin ray 20.5-23.9; caudal-fin length 32.0-70.5.

Live coloration (based on photographs of specimens from Great Detached Reef, Lizard Id and One Tree Id, Great Barrier Reef and on notes taken from captive specimens; Plates 3H-I): head and body pale pink, becoming pearly white ventrally and sometimes pale yellow or pale grey posteriorly; area dorsoanterior to line from snout tip to point ranging from anterior third of dorsal fin to dorsal edge of caudal peduncle either bright yellow or bluish grey; pale blue line extending around posteroventral orbital rim along ventral edge of first infraorbital bone to middle of upper lip; iris pale yellow to bright orange with bright blue suboval ring around pupil, upper part of ring often broken into short streaks and spots; dorsal fin either bright yellow anteriorly, becoming pale grey posteriorly, usually with distal margin bright blue, bright yellow to orange submarginally (yellow-topped form) or dark grey to dark blue or black anteriorly becoming pale yellow posteriorly, usually with distal margin bright blue, dark grey to dark blue submarginally (dark-topped form); distal half of yellow area of dorsal with about six to 15 fine, slightly oblique grey lines, distal half of grey area of fin with about six to 15 fine, slightly oblique pale yellow to pale orange lines; anal fin bright yellow to bluish hyaline with about three to eight fine, pale orange to pale grey oblique lines on distal part of fin; caudal fin pale blue to hyaline (yellow-topped form) or bright yellow to yellowish hyaline (dark-topped form) usually with about three to six fine pale orange to grey stripes on upper and lower edges of fin, sometimes with basal portion of upper rays grey; pectoral fins pinkish hyaline; pelvic fins pale pink or yellow to bluish hyaline or hyaline.

Preserved coloration: pattern similar to live coloration, head and body becoming pale yellow-brown; blue, yellow and grey areas becoming dark brown to dark grey; dorsal fin dusky hyaline, dark brown to dark grey anteriorly and distally; distal half of fin with several rows of short dark streaks; anal fin dusky hyaline with several rows of short dark streaks distally; caudal fin hyaline to whitish, dusky basally and sometimes along inner part of upper lobe; pectoral fins hyaline; pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Oxycercichthys veliferus* is known only from the Great Barrier Reef of Australia, from Great Detached Reef south to the Capricorn Group (Figure 7). It has been collected mainly from sand-edged rock and coral reef areas on reef slopes at depths ranging from 15 to 50 m.

COMPARISONS: Characters distinguishing *O. veliferus* from other pseudochromines are discussed under *Remarks* for the generic account.

REMARKS: *Oxycercichthys veliferus* is a relatively large species; the largest specimen examined measured 85.5 mm SL. It has two distinct colour forms, one with the dorsal contour of the head and nape bright yellow and the other with this area dark grey to black (see above). The dark-topped form has been illustrated by Burgess et al. (1988: pl. 151, lower right colour fig., 1991), Gill (1990b, 1997) and Fosså & Nilsen (1993). The yellow-topped form has been illustrated by Gill (1990b; 1997) and Kuiter (1992). Burgess et al. (1989: pl. 151, lower left colour fig.) also illustrated a yellow-topped pseudochromid as this species but it is actually referable to *Ogilbyina novaehollandiae*.

Lubbock (1980) noted that a captive yellow-topped specimen changed colour to the dark-topped form over a period of about two weeks. Given the apparent occurrence of sequential hermaphroditism in at least some other pseudochromines, it is likely that the two colourations are sex-related. It has not been possible to test this hypothesis with museum specimens as the colour forms become indistinguishable following preservation.

ETYMOLOGY: The specific epithet is from the Latin *velum*, sail, and *fero*, to carry or bear, with reference to the relatively large dorsal and caudal fins.

MATERIAL EXAMINED: No locality data (aquarium trade specimen), AMS I.31555-001, 1(1), 68.1 mm SL (subsequently cleared and stained). GREAT BARRIER REEF, AUSTRALIA: Great Detached Reef, BPBM 31026, 2(2), 80.2-80.4 mm SL; S side of sand cay N of Lizard Id, AMS I.19449-005, 1(1), 73.3 mm SL; Lizard Id, North Point, BMNH 1979.1.9.36, 1(1), 60.7 mm SL (holotype), BMNH 1979.1.9.39-40, 2(2), 55.2-77.0 mm SL (paratypes), BMNH 1983.3.25.199, 1(0), BPBM 22523, 1(1), 54.4 mm SL (paratype); Lizard Id, AMS I.18662-022, 1(1), 82.0 mm SL; Lizard Id, SE tip of Direction Id, AMS I.25117-001, 1(1), 50.0 mm SL; Escape Reef North, AMNH 37638, 1(1), 32.5 mm SL, AMNH 213593, 2(2), 68.7-85.5 mm SL, AMS I.22620-009, 1(1), 73.0 mm SL; Opal Reef, WAM P.25176-014, 1(1), 70.0 mm SL; Flynn Reef, USNM 290089, 2(2), 47.5-53.9 mm SL; Capricorn Group, One Tree Id, AMS I.15682-022, 1(1), 82.0 mm SL (paratype).

PHOLIDOCHROMIS gen. nov.

TYPE SPECIES: *Pseudochromis marginatus* Lubbock

DIAGNOSIS: *Pholidochromis* may be distinguished from other pseudochromid genera by the following combination of external characters: lower lip complete; dorsal-fin rays III,22; anal-fin rays III,13; scales in lateral series 28-32; dorsal and anal fins with well-developed scale sheaths; and predorsal scales extending anteriorly to or forward of posterior nostrils. It is also distinctive osteologically among pseudochromids in having a combination of three equal-sized supraneural bones, the first dorsal pterygiophore posterior lamina running most of the length of the bone, and an anterior dorsal-fin pterygiophore formula of S*/S/S + 3/1 + 1/1/1/1/1/1/1/1/1/1/1/1/1 + 1*/1.

REMARKS: This genus includes a single species that had been previously placed in *Pseudochromis*. It was referred to as 'new genus C' by Gill, Leis & Rennis (2000). It resembles *Ogilbyina*, *Oxycercichthys* and *Labracinus* in general body shape and in having scaly dorsal- and anal-fin bases (although fin-base scales are absent in *Oxycercichthys*), a complete lower lip (one of 17 specimens of *P. marginata* had the lower lip weakly interrupted at the symphysis) and the posterior lamina of the first dorsal pterygiophore running most of the length of the bone. It differs from these genera in possessing lower fin-ray and scale counts [segmented dorsal-fin rays 22 versus 24-38, segmented anal-fin rays 13 versus 13-21 (rarely 13), scales in transverse series 28-32 versus 43-74 and circumpeduncular scales 16 versus 19-32]. It further differs in having the predorsal scales extending anteriorly to at least the posterior nostrils (versus to a point ranging from the posterior AIO pores to midway between the anterior AIO and posterior nasal pores in *Ogilbyina*, *Oxycercichthys* and *Labracinus*). Meristic values and the anterior dorsal-fin pterygiophore formula for the genus are similar to those for the genus *Cypho*. However, *Cypho* species usually have 14 segmented anal-fin rays, lack scale sheaths on the dorsal and anal fins, and have shallower bodies (dorsal-fin origin to pelvic-fin origin 26.8-30.6 % SL versus 33.4-36.3 % SL for *Pholidochromis*).

ETYMOLOGY: The generic name is from the Greek *pholis*, meaning a scale or spot, and *chromis*, a genus of pomacentrid fish that has been used as the stem for various other fish genera (including pseudochromids, cichlids and pomacentrids), and alludes to the distinctive dark spots surrounding the head pores. Gender is feminine.

Pholidochromis marginata (Lubbock)

Margined Dottyback

Figures 5, 19-20

Pseudochromis marginatus Lubbock 1980: 829, fig. 4 (type locality: Massas Id, Madang Harbour, Papua New Guinea); Kailola, 1987: 244 (list); Gill, 1999b: 2562 (key).

DIAGNOSIS:.As for genus.

DESCRIPTION (based on 17 specimens, 27.2-49.3 mm SL):

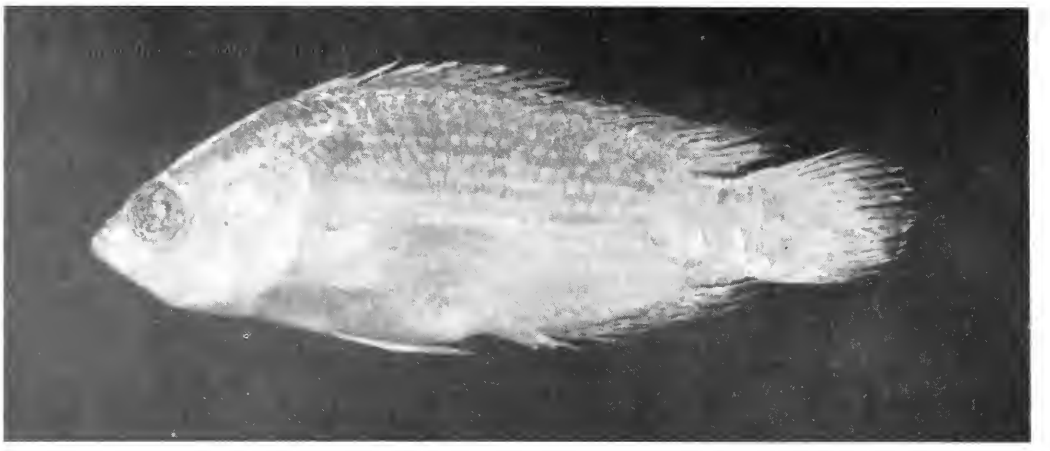

Figure 19. *Pholidochromis marginata*, CAS 65780, 39.4 mm SL, spotted form, N of Nagada River mouth, Madang Province, Papua New Guinea. (Photo by P. Crabb)

dorsal-fin rays III,22, last 8-22 segmented rays branched; anal-fin rays III,13, all or all but first 1-2 segmented rays branched; pectoral-fin rays 18-20, upper procurrent caudal-fin rays 5-6; lower procurrent caudal-fin rays 5-6; total caudal-fin rays 27-29; scales in lateral series 28-32; anterior lateral-line scales 19-27; anterior lateral line terminating beneath segmented dorsal-fin ray 13-20; posterior lateral-line scales 9-11 + 0-3; scales between lateral lines 2-3; horizontal scale rows above anal-fin origin 12-13 + 1 + 2-4 = 16-18; circumpeduncular scales 16; predorsal scales 16-26; scales behind eye 2-3; scales to preopercular angle 4-5; gill rakers 4-6 + 10-11 = 14-17; pseudobranch filaments 7-10; circumorbital pores 16-19; preopercular pores 7-13; dentary pores 4; posterior interorbital pores 0.

Lower lip usually complete (incomplete with weak symphyseal interruption in only one specimen); dorsal and anal fins with well-developed scale sheaths; predorsal scales extending anteriorly to point ranging from vicinity of posterior nostrils to anterior nostrils; opercle with 3-6 small to moderate-sized, usually indistinct serrations; teeth of outer ceratobranchial 1 gill rakers usually well-developed on raker tips only, although well-developed teeth may run most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1/1/1/1/1/1/1/1/1 + 1*/1; dorsal-fin spines pungent and moderately slender; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1/1/1 + 1*/1; anal-fin spines pungent and moderately stout to stout, second spine stouter than third; pelvic-fin spine slender, tip moderately to weakly pungent or flexible; second or third segmented pelvic-fin ray longest; caudal fin rounded; vertebrae 10 + 16; epineurals 12-13; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1-2 (on sides of jaw) irregular rows of small conical teeth, outermost of rows of teeth much larger and more curved than those of inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical to caniniform teeth, those on middle of jaw large and caniniform; vomer with 1 row of small conical teeth arranged in chevron; palatine with 1-3 irregular rows of small conical teeth arranged in ovoid patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 16 specimens, 27.2-45.6 mm SL): head length 26.6-30.9; orbit diameter 9.1-12.5; snout length 6.6-8.2; fleshy interorbital width 5.0-6.2; bony interorbital width 3.0-4.0; body width 12.9-15.2; snout tip to posterior tip

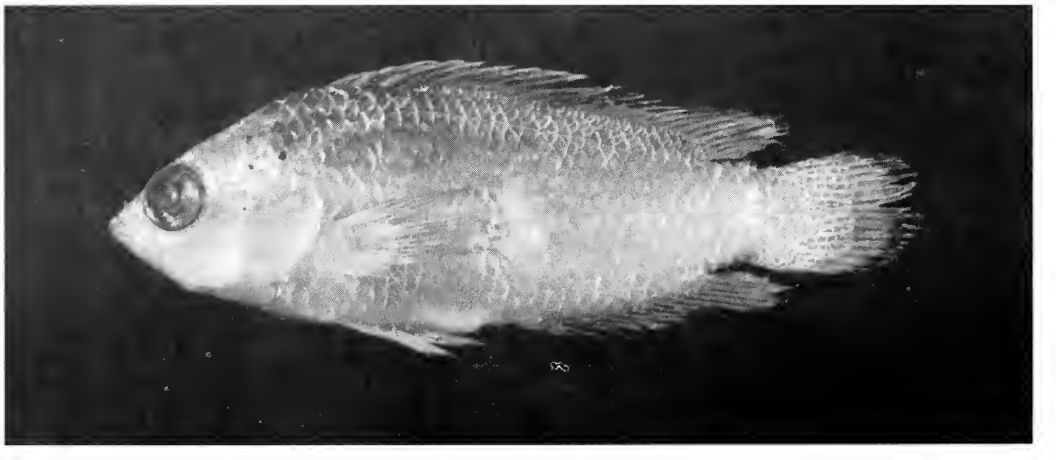

Figure 20. *Pholidochromis marginata*, CAS 65783, 32.4 mm SL, non-spotted form, southern side of Nagada Harbour, Madang Province, Papua New Guinea. (Photo by P. Crabb)

of retroarticular bone 15.2-17.1; predorsal length 35.3-39.0; prepelvic length 34.6-37.1; posterior tip of retroarticular bone to pelvic-fin origin 20.2-21.3; dorsal-fin origin to pelvic-fin origin 33.4-36.3; dorsal-fin origin to middle dorsal-fin ray 33.5-38.9; dorsal-fin origin to anal-fin origin 43.8-47.0; pelvic-fin origin to anal-fin origin 25.3-30.1; middle dorsal-fin ray to dorsal-fin termination 20.5-26.2; middle dorsal-fin ray to anal-fin origin 31.1-34.7; anal-fin origin to dorsal-fin termination 36.3-40.9; anal-fin base length 27.7-30.3; dorsal-fin termination to anal-fin termination 16.3-18.5; dorsal-fin termination to caudal peduncle dorsal edge 8.8-11.0; dorsal-fin termination to caudal peduncle ventral edge 18.1-20.1; anal-fin termination to caudal peduncle dorsal edge 17.3-21.8; anal-fin termination to caudal peduncle ventral edge 10.7-12.4; first dorsal-fin spine 2.7-5.1; second dorsal-fin spine 5.1-7.4; third dorsal-fin spine 7.0-10.3; first segmented dorsal-fin ray 11.0-13.9; fourth last segmented dorsal-fin ray 17.4-21.0; first anal-fin spine 3.0-5.7; second anal-fin spine 5.7-9.6; third anal-fin spine 7.1-11.1; first segmented anal-fin ray 10.8-14.9; fourth last segmented anal-fin ray 16.2-20.0; third pectoral-fin ray 14.0-20.1; pelvic-fin spine 9.6-13.2; second segmented pelvic-fin ray 22.6-26.3; caudal-fin length 23.9-26.5.

Live coloration: not known.

Preserved coloration: head and body brown to light brown, paler ventrally, sometimes with pale yellowish brown spots on scales; dusky grey to black pigmentation present around sensory pores of head (including postorbital, upper preopercular, anterior interorbital, posterior temporal and parietal pores); dorsal and anal fins varying from pale brown to dark grey-brown, usually with dark grey to black submarginal stripe on posterior part of each fin, sometimes with two to five rows of pale yellowish brown spots along basal halves of fins; caudal fin varying from pale brown to dark grey-brown becoming paler or hyaline posteriorly, usually with dark grey to black convex submarginal stripe, sometimes with intermittent brown and pale yellowish brown spots; pectoral and pelvic fins light brown to hyaline.

HABITAT AND DISTRIBUTION: This species was previously known only from the vicinity of Madang, Papua New Guinea. Its range is extended here to include Bougainville in the North Solomon Ids and Talisei Id, Sulawesi, Indonesia (Figure 5). It has been collected from reefs among sponges and hard and soft corals, sometimes in relatively silty areas, at depths ranging from 1 to 10 m.

COMPARISONS: Comparisons with similar taxa are given under *Remarks* for the generic account. In addition to the characters discussed there, the preserved coloration of *P. marginata* is diagnostic. Although males of *Pseudochromis tapeinosoma* also possess dark grey or black submarginal dorsal and caudal-fin stripes, they lack the dark head-pore spots. Other species with dark head-pore spots (e.g., *Pseudochromis dutoiti* and *P. springeri*) differ in other coloration details and are more elongate in body shape.

REMARKS: *Pholidochromis marginata* is a moderately small pseudochromine; the largest examined specimen measured 49.3 mm SL. The live ground coloration of *P. marginata* is probably similar to that of species of *Ogilbyina*, *Labracinus* and *Cypho*. Typically, species of these genera are sexually dimorphic; males are generally reddish (at least anteriorly) in coloration, whereas females are generally brownish with a reddish area above the anal-fin origin. Although *P. marginata* can be more-or-less divided into pale-spotted and unspotted forms (Figures 19-20), these colourations do not appear to be sexually associated.

ETYMOLOGY: The specific epithet is from the Latin, meaning to furnish with a border, and alludes to the typical dark submarginal stripes on the caudal, dorsal and anal fins.

MATERIAL EXAMINED: INDONESIA: Sulawesi, Talisei Id, USNM 136954, 1(1), 43.9 mm SL. PAPUA NEW GUINEA: Madang Harbour, opposite N end of Sek Id, AMS I.16671-043, 1(1), 45.6 mm SL (paratype), BMNH 1979.1.9.14, 1(1), 45.5 mm SL (paratype); Nagada Harbour, CAS 65780, 1(1), 39.4 mm SL, CAS 65783, 3(3), 32.4-36.6 mm SL, CAS 65792, 1(1), 35.3 mm SL, USNM 296186, 1(1), 27.2 mm SL, USNM 296203, 2(2), 28.7-34.4 mm SL (34.4 mm SL specimen subsequently cleared and stained); 300 m S of Wongat Id, CAS 65793, 1(1), 30.3 mm SL; Madang Harbour, off Massas Id, AMS I.17087-009, 1(1), 40.9 mm SL (holotype), USNM 290671, 1(1), 45.3 mm SL; Madang Harbour, Sinaub Id lagoon, BPBM 15762, 1(1), 49.3 mm SL (paratype); North Solomon Ids, Bougainville, Tautsina Id, USNM 290323, 2(2), 38.0-42.2 mm SL.

PICTICHROMIS gen. nov.

TYPE SPECIES: *Pseudochromis porphyreus* Lubbock & Goldman

DIAGNOSIS: Species of the genus *Pictichromis* differ from other pseudochromids in possessing the following combination of characters: dorsal-fin rays III,20-22 (usually 22); anal-fin rays III,10-13 (usually 12); scales in lateral series 31-43; anterior lateral-line scales 17-28; gill rakers 5-8 + 13-17 = 18-24; and teeth of outer ceratobranchial-1 gill rakers well-developed, arranged in two rows running most of length of rakers. The genus is also distinctive osteologically among pseudochromines in having, in combination, a single cartilage head anteriorly on infrapharyngobranchial 2 and a large dorsomedial lamina on the mesopterygoid.

REMARKS: The six included species are very similar in morphology, differing primarily in live coloration. It is not surprising, then, that they have been previously hypothesised as closely related and regarded as a species-complex of *Pseudochromis* (Lubbock, 1980; Gill et al., 1996). However, *Pictichromis* species lack several putative specialised characters that are present in *Pseudochromis*. The most notable of these is the presence of two cartilage heads anteriorly on infrapharyngobranchial 2 (versus a single head in *Pictichromis*). Externally the genus is readily distinguished from *Pseudochromis* and other pseudochromine genera in having, in combination, a low number of segmented dorsal- and anal-fin rays [21-22 (usually 22) and 10-13 (usually 12), respectively] and a relatively large number of gill rakers (5-8 + 13-17 = 18-24), with well-developed teeth running most of the length of the ceratobranchial-1 outer rakers. It was referred to as 'new genus D' by Gill, Leis & Rennis (2000).

Pictichromis species are generally found on reef slopes and dropoffs in relatively deep water (to 70 metres in *P. paccagnellae*). Considering the difficulties associated with collecting small cryptic reef fishes at these depths, it is likely that there are more species in the genus awaiting discovery. It is likely, for example, that either one or both of the two unidentified "*Pseudochromis*" species reported by Thresher & Colin (1986) from 93 and 122 m at Enewetak, Marshall Ids may be referable to this genus. In support of this, the live colours of the two species ("purple with red dorsal fin" and "yellow with red lateral stripe") fit the more-or-less magenta/yellow colourations known for other *Pictichromis* species.

Pictichromis diadema, *P. paccagnellae*, *P. coralensis* and *P. porphyrea* are among the most popular pseudochromids in the aquarium fish trade and have been extensively illustrated in the literature associated with that industry.

ETYMOLOGY: The generic name is from the Latin *pictus*, meaning painted or coloured, and the Greek *Chromis*, a genus of pomacentrid fish that has been used as the stem for various other fish genera (including pseudochromids, cichlids and pomacentrids), and alludes to the bright live colourations of the included species. Gender is feminine.

Key to species of *Pictichromis*

1a. Posterior part of body blue grey or reddish purple to magenta in life (not noticeably paler than anterior or dorsoanterior part of body in preservative) 2
1b. Posterior part of body entirely or partly bright yellow in life (yellow area usually noticeably paler than anterior or dorsoanterior part of body in preservative) 3

2a. Head and body reddish purple to magenta in life (pale brown to purplish grey or brown in preservative) (Japan, eastern Philippines, northeastern Indonesia, Belau, eastern Melanesia, American Samoa, Marshall Ids and Kiribati) ..... *P. porphyrea*
2b. Snout, dorsal contour of head and sometimes dorsal contour of body to beneath posterior part of dorsal fin bright yellow in life (pale brown in preservative), the remainder of head and body dark blue-grey to magenta (brown in preservative) (New Guinea) ..... *P. aurifrons*

3a. Dorsal contour of head and body magenta in life (greyish brown in preservative), the remainder of head and body bright yellow (pale brown in preservative) (Peninsular Malaysia to the western Philippines and northern Borneo) ... *P. diadema*
3b. Head entirely magenta in life (dorsal contour of head and body not noticeably darker than remainder of head and body in preservative) 4

4a. Posterior part of body bright purple (pinkish grey in preservative) with bright yellow (pale yellow in preservative) saddle-like marking extending from dorsal-fin base to upper caudal-fin rays (southeastern Papua New Guinea and northern Sulawesi, Indonesia) ..... *P. ephippiata*
4b. Head and body anterior to a more-or-less vertical line through vicinity of anal-fin origin magenta in life (greyish brown to brown or grey in preservative), remainder of body bright yellow (pale brown to brown or pale greyish brown in preservative) 5

5a. Scales in lateral series 36-43, usually 38-42 (Great Barrier Reef, New Caledonia and western Coral Sea) ..... *P. coralensis* sp. nov.
5b. Scales in lateral series 33-39, usually 33-38 (Indonesia, Timor Sea, Belau, Papua New Guinea, Solomon Ids and Vanuatu) ..... *P. paccagnellae*

***Pictichromis aurifrons* (Lubbock)**
Gold-browed Dottyback
Figure 21; Plate 3J

Pseudochromis aurifrons Lubbock, 1980: 824, fig. 2 (type locality: Basilisk Passage, Papua New Guinea); Kailola, 1987: 243 (list); Gill et al., 1996: 99 (comparison; distribution); Barrall & Gill, 1997: 48 (habitat and distribution; colour fig.); Gill, 1999b: 2562 (key).
'Psendochromis' aurifrons; Gill, 1999a: 81, tab. I (comparison; distribution).

DIAGNOSIS: *Pictichromis aurifrons* is distinguished from congeneric species in having a bright yellow (pale brown in preservative) dorsal contour of head and nape, with the remainder of head and body dark blue-grey to magenta (brown in preservative).

DESCRIPTION (based on one specimen, 46.2 mm SL): dorsal-fin rays III,22, all segmented rays branched; anal-fin rays III,12, all segmented rays branched; pectoral-fin rays 18; upper procurrent caudal-fin rays 7; lower procurrent caudal-fin rays 6; total caudal-fin rays 30; scales in lateral series 36; anterior lateral-line scales 24; anterior lateral line terminating beneath segmented dorsal-fin ray 15; posterior lateral-line scales 7-10 + 0; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 12 + 1 + 2 = 15; circumpeduncular scales 16; predorsal scales 19; scales behind eye 2-3; scales to preopercular angle 4; gill rakers 6 + 15 = 21; pseudobranch filaments 9; circumorbital pores 20-21; preopercular pores 8-10; posterior interorbital pores 1.

Lower lip incomplete; dorsal and anal fins without scale sheaths; predorsal scales extending anteriorly to vicinity of posterior nasal pores; opercle with 6-7 small serrations; teeth of outer ceratobranchial-1 gill rakers well-developed, arranged in two rows running most of length of rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1/1/1 + 1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1/1 + 1/1/1 + 1; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine moderately stout and pungent; second segmented pelvic-fin ray longest; caudal fin truncate; vertebrae 10 + 16; epineurals 12; epurals 3.

Upper jaw with 2 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2 pairs of curved, enlarged caniniform teeth anteriorly, and 3-4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw slightly larger and curved;

vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL: head length 24.2; orbit diameter 9.7; snout length 6.5; fleshy interorbital width 6.5; bony interorbital width 5.0; body width 13.2; snout tip to posterior tip of retroarticular bone 14.1; predorsal length 35.1; prepelvic length 32.1; posterior tip of retroarticular bone to pelvic-fin origin 20.3; dorsal-fin origin to pelvic-fin origin 27.9; dorsal-fin origin to middle dorsal-fin ray 30.7; dorsal-fin origin to anal-fin origin 40.7; pelvic-fin origin to anal-fin origin 28.1; middle dorsal-fin ray to dorsal-fin termination 23.8; middle dorsal-fin ray to anal-fin origin 25.8; anal-fin origin to dorsal-fin termination 32.3; anal-fin base length 22.7; dorsal-fin termination to anal-fin termination 17.1; dorsal-fin termination to caudal peduncle dorsal edge 15.8; dorsal-fin termination to caudal peduncle ventral edge 22.5; anal-fin termination to caudal peduncle dorsal edge 24.0; anal-fin termination to caudal peduncle ventral edge 16.7; first dorsal-fin spine 1.5; second dorsal-fin spine 5.8; third dorsal-fin spine 9.5; first segmented dorsal-fin ray 13.4; fourth last segmented dorsal-fin ray 18.2; first anal-fin spine 1.5; second anal-fin spine 5.2; third anal-fin spine 8.7; first segmented anal-fin ray 12.8; fourth last segmented anal-fin ray 16.5; third pectoral-fin ray 15.4; pelvic-fin spine 12.3; second segmented pelvic-fin ray 21.6; caudal-fin length 24.0.

Live coloration (based on photographs of specimens from off Biak Id, Irian Jaya, and description provided by Lubbock, 1980; Plate 3J): lips, snout and dorsal contour of head and sometimes dorsal contour of body bright yellow, bright yellow coloration varying in extent posteriorly from area above middle of eye to beneath base of posterior dorsal-fin rays; remainder of head and body dark blue-grey with pinkish tinges to magenta, becoming pale blue-grey to white ventrally, sometimes with lower part of head pale to bright yellow; iris bright yellow, sometimes magenta posteriorly, with purplish blue to dark blue suboval ring around pupil; bright yellow and blue grey to magenta areas on head and body sometimes separated by pale pink to white line or irregular series of spots; dorsal fin bright yellow to yellowish or pinkish hyaline, with basal quarter of fin grey to magenta or bright yellow; dorsal- and anal-fin spines sometimes edged anteriorly with pale pink to magenta; anal fin pinkish hyaline, sometimes with basal parts of posterior few rays pale pink to magenta; caudal fin blue-grey to magenta on central, basal portion (giving rounded appearance to fin), becoming hyaline posteriorly and pinkish hyaline on dorsal and ventral margins; pectoral fins pinkish hyaline; pelvic fins pinkish to yellowish hyaline, sometimes with spine pale pink to mauve.

Preserved coloration: snout and dorsal contour of head and nape pale brown, remainder of head and body brown, paler on ventral contour; caudal fin brown basally, becoming pale brownish hyaline distally; other fins pale brownish hyaline to hyaline.

HABITAT AND DISTRIBUTION: Until recently, this species was known only from the holotype collected at a depth of 25 m among rocks on a reef slope at Basilisk Passage, near Port Moresby, Papua New Guinea. However, Barrall & Gill (1997) reported on several individuals that were recently sighted and photographed by G. Barrall and K. De Wet at Biak Id, off Irian Jaya (Figure 21). According to G. Barrall (pers. comm.) the

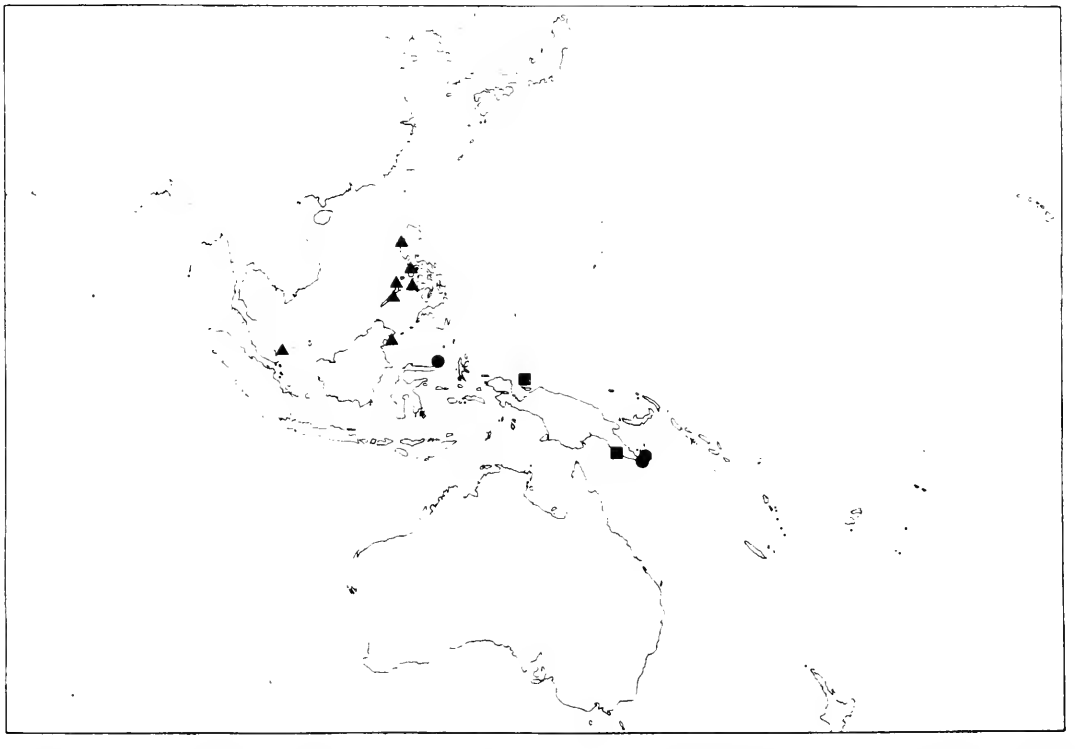

Figure 21. Distributional records for *Pictichromis aurifrons* (squares), *P. diadema* (triangles) and *P. ephippiata* (closed circles).

specimens were found at two dive sites located approximately 70 km apart on small, isolated coral patches on sandy reef slopes in 21 to 48 m. *Pictichromis porphryrea* was commonly seen in the area, but not at the two locations where *P. aurifrons* was seen (Barrall & Gill, 1997).

COMPARISONS: As noted by Gill et al. (1996) and Gill (1999a), the six species of *Pictichromis* are distinguished primarily on the basis of live coloration: *P. aurifrons* is dark blue to magenta with the dorsal contour of the head and sometimes the dorsal contour of the body bright yellow; *P. diadema* is bright yellow with the dorsal contour of the head and body magenta; *P. coralensis* and *P. paccagnellae* are magenta on the anterior half of the body and bright yellow on the posterior half; *P. ephippiata* is magenta with a bright yellow saddle-like marking extending from the dorsal-fin base to the upper caudal-fin rays, and *P. porphyrea* is uniform reddish purple to magenta. Although these coloration differences are usually apparent in preserved specimens (dark blue to magenta markings become purplish grey to brown; bright yellow markings become pale yellow, pale brown, pale greyish brown or brown), they are often obscure, particularly in old or poorly preserved specimens. With the exception of *P. coralensis*, which has higher numbers of scales in lateral series than the remaining species (see *Comparisons* under the account for *P. coralensis*), meristic and morphometric values for *Pictichromis* species broadly overlap; multivariate statistical analyses of these characters also failed to consistently distinguish the species. As the six species are more-or-less allopatrically distributed throughout the east Indian and central/West Pacific Oceans (except for sympatry between *P. ephippiata* and *P. paccagnellae* in southeastern Papua New Guinea and northern Sulawesi, narrow overlap between *P. paccagnellae* and *P. porphyrea* in Indonesia, Belau and several Melanesian localities, and possible sympatry between *P. aurifrons* and *P. porphyrea* at Biak Id), geographic origin is probably the easiest method of distinguishing faded museum specimens.

The live coloration of the holotype of *P. aurifrons* resembles that of *Pseudochromis andamanensis*. However, *P. andamanensis* has more segmented anal-fin rays (13-15 versus 12 in *P. aurifrons*), fewer lower gill rakers (11-12 versus 15), and well-developed teeth on the outer ceratobranchial-1 rakers confined to the raker tips (versus running most of the length of rakers).

REMARKS: *Pictichromis aurifrons* is a rare species known in museum collections only on the basis of the holotype. Barrall & Gill (1997) provide a colour photograph of a live specimen. The possession of the pale pink to white area between the bright yellow and the blue-grey to magenta portions of the body may be sex related, as is suggested below for *P. coralensis*, *P. diadema* and *P. paccagnellae* (see *Comparisons* for *P. coralensis*).

ETYMOLOGY: The specific name is from the Latin *aureus*, golden, and *frons*, brow, with reference to the distinctive live coloration.

MATERIAL EXAMINED: PAPUA NEW GUINEA: Basilisk Passage, BMNH 1979.1.9.12, 1(1), 46.2 mm SL (holotype).

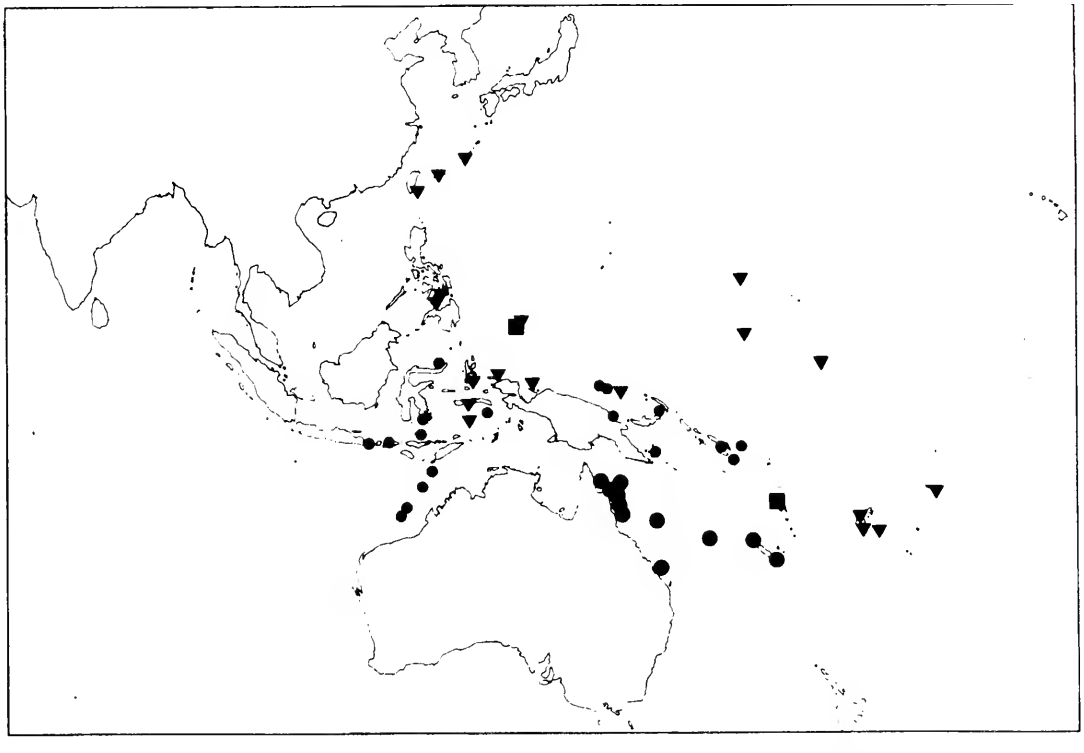

Figure 22. Distributional records for *Pictichromis coralensis* (large closed circles), *P. paccagnellae* (small closed circles), *P. paccagnellae* + *P. porphyrea* (squares) and *P. porphyrea* (triangles).

***Pictichromis coralensis* sp. nov.**
Bicoloured Dottyback
Figure 22; Plate 4A

Pseudochromis sp.; Power, 1969: 43 (colour fig.; Wistari Reef, Great Barrier Reef); Gill et al., 1996: 99 (comparison; distribution).

Pseudochromis paccagnellae [*non* Axelrod, 1973]; Burgess & Axelrod, 1976: figs 334-335 (colour figs; Great Barrier Reef); Fourmanoir & Laboute, 1976: 285 (colour fig.; Belap Ids and southern New Caledonia); Coleman, 1981: 92 (colour fig.; Great Barrier Reef); Russell, 1983: 44 (list; Capricorn-Bunker Group, Great Barrier Reef); Gill, 1993: 50 (colour fig.); Kulbicki et al., 1994: 19 (list; Chesterfield Ids, Coral Sea); Kuiter, 1997: 59 (colour fig.; habitat; distribution in part).

'*Pseudochromis*' sp.; Gill, 1999a: 81, tab. I (comparison; distribution).

Pseudochromis sp. 1; Gill, 1999b: 2562 (key).

HOLOTYPE: AMS I.20779-174, 50.3 mm SL, Australia, Great Barrier Reef, Tijou Reef, coral reef over sand, 2-25 m, AMS party, 22 February 1979.

PARATYPES: AMS I.20779-229, 1: 28.0 mm SL, collected with holotype; QM I.16046, 1: 38.5 mm SL, collected with holotype; BMNH 1933.8.12.28, 1: 28.0 mm SL, Australia, Great Barrier Reef, W of North Direction Id, Great Barrier Reef Expedition; AMS I.22508-004, 1: 33.9 mm SL, Australia, Great Barrier Reef, Lizard Id, reef off North Point, 10-15 m, B. Goldman, 26 June 1973; BMNH 1983.3.25.192-193, 2: 37.0-39.0 mm SL, Great Barrier Reef, Lizard Id, North Point, rocks on sand, 15 m, R. Lubbock, 3 May 1975; BMNH 1983.3.25.194, 1: 39.7 mm SL, Australia, Great Barrier Reef, Lizard Id, North Point, 20 m, R. Lubbock, 1 June 1975; BMNH 1983.3.25.196, 1: 30.0 mm SL, Australia, Great Barrier Reef, Lizard Id, North Point, coral on sand, 15 m, R. Lubbock, 28 May 1975; NTM S.10552-007, 1: 33.2 mm SL, Australia, Great Barrier Reef, Lizard Id, Watson's Bay, H.K. Larson, 12 February 1977; AMS I.22580-004, 4: 33.3-42.9 mm SL, Australia, Great Barrier Reef, Escape Reef, coral sand bottom in sandstone gutters, 37 m, AMS party, 28 October 1981; AMS I.22613-008, 3: 35.0-46.2 mm SL (46.2 mm SL specimen cleared and stained), Australia, Great Barrier Reef, Escape Reef, coral and sand, 27 m, rotenone, A. Ayling, D. Blake, B. Goldman and D. Rennis, 1 November 1981; AMS I.22620-010, 3: 31.4-39.2 mm SL, Australia, Great Barrier Reef, Escape Reef, coral and sand in cave, 38-40 m, rotenone, G.R. Allen, A. Ayling and W.A. Starck II, 3 November 1981; AMS I.22637-015, 1: 39.1 mm SL, Australia, Great Barrier Reef, Escape Reef, coral, 3-15 m, rotenone, D. Blake, W. Gladstone, J.R. Paxton and D. Rennis, 7 November 1981; AMS I.22640-003, 1: 39.0 mm SL, Australia, Great Barrier Reef, Escape Reef, outer reef face, rotenone, W.A. Starck II, 9 November 1981; AMNH 211953, 3: 26.4-40.0 mm SL, Australia, Great Barrier Reef, S side of Endeavour Reef, ca. 1 mile E of W end; AMS I.15684-018, 1: 43.2 mm SL, Australia, Great Barrier Reef, Capricorn Group, One Tree Id, 28.5 m, explosives, F.H. Talbot et al., 1 December 1969; AMS I.18204-001, 1: 50.6 mm SL, Australia, Great Barrier Reef, Capricorn Group, One Tree Id, 10 m, R.H. Kuiter, 19 September 1974; AMS I.18277-001, 1: 48.0 mm SL, Australia, Great Barrier Reef, Capricorn Group, One Tree Id, SW dropoff, R.H. Kuiter, 21 September 1974; AMS I.20206-036, 2: 49.6-52.2 mm SL, Australia, Great Barrier Reef, Capricorn Group, One Tree Id, cave below dropoff outside lagoon, 22-30 m, rotenone, F.H. Talbot et al., 3 December 1969; AMS I.25107-009, 7: 13.7-44.8 mm SL, Australia, Coral Sea, Osprey Reef, W edge dropoff, 10-25 m, rotenone, AMS party, 6 November 1984; AMS I.25112-021, 2: 41.1-41.5 mm SL, Australia, Coral Sea, Osprey Reef, W edge of reef, 1-15 m, rotenone, AMS party, 8 November 1984; WAM P.29638-006, 1: 35.7 mm SL, Australia, Coral Sea, Lihou Reef and Cays, Anne Cay, 20-35 m, rotenone, G.R. Allen, 13 November 1987; AMS I.17466-019, 1: 45.5 mm SL, New Caledonia, Puetege Reef, 6-25 m, spear and quinaldine, G.R. Allen and W.A. Starck II, 15 June 1973; ROM 72057, 16: 30.5-42.5 mm SL, 30.5-42.5 mm SL, New Caledonia, Port de Goro, W of concrete lighthouse (22°20'00"S 167°00'20"E), cave at base of drop-off with silty bottom and fringing reef (dead and live corals and hydroids), 18-25.5 m, R. Winterbottom, G. Klassen and P. Tirard, 3 September 1991.

DIAGNOSIS: *Pictichromis coralensis* is distinguished from congeners in having 36-43, usually 38-42, scales in lateral series in combination with the following live coloration: head and body anterior to a more-or-less vertical line through vicinity of anal-fin origin magenta, the remainder of body bright yellow. The coloration usually persists in preservative (magenta becomes greyish brown to grey or brown, bright yellow becomes pale brown to greyish brown), but is often difficult to perceive.

DESCRIPTION (based on 54 specimens, 28.0-52.2 mm SL; minimum and maximum value ranges given first for all type specimens, followed, where different, by values for holotype enclosed in parentheses): dorsal-fin rays III,21-22 (III,21), all or all but first 1-2 (all) segmented rays branched; anal-fin rays III,11-12 (III,12), all or all but first 1-2 ((all) segmented rays branched; pectoral-fin rays 16-18 (18/17); upper procurrent caudal-fin rays 6-8 (7); lower procurrent caudal-fin rays 6-7 (7); total caudal-fin rays 29-32 (31); scales in lateral series 36-43 (38/40); anterior lateral-line scales 21-28 (22/24); anterior lateral line terminating beneath segmented dorsal-fin ray 10-15 (12/14); posterior lateral-line scales 0-10 + 0 (5 + 0/7 + 0); scales between lateral lines 3-4 (4/4); horizontal scale rows above anal-fin origin 12-15 + 1 + 1-3 = 14-18 (13 + 1 + 2/13 + 1 + 2); circumpeduncular scales 16-19 (16); predorsal scales 17-22 (20); scales behind eye 2-3 (3); scales to preopercular angle 3-5 (5); gill rakers 5-7 + 14-16 = 20-23 (6 + 15); pseudobranch filaments 8-12 (11); circumorbital pores 17-28 (22/22); preopercular pores 7-13 (8/8); dentary pores 4-5 (4/4); posterior interorbital pores 1-2 (1).

Lower lip incomplete; dorsal and anal fins without distinct scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from anterior AIO to posterior nostrils; opercle with 4-10 usually relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed, arranged in two rows running most of length of rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1/1 + 1*/1/1/1 or S/S/S + 3/1 + 1/1/1/1/1/1/1/1/1 + 1*/1 (S/S/S + 3/1 + 1/1/1/1/1/1/1/1/1 + 1/1); dorsal-fin spines moderately stout to stout and

pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1 (3/1 + 1/1/1); anal-fin spines moderately stout to stout and pungent, second spine stouter than third; pelvic-fin spine moderately stout to stout and pungent; second segmented pelvic-fin ray longest; caudal fin truncate to emarginate;; vertebrae 10 + 16; epineurals 12-15 (12); epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw enlarged and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 14 specimens, 26.4-52.2 mm SL): head length 22.3-26.9 (23.9); orbit diameter 7.9-11.4 (8.5); snout length 6.0-7.1 (6.2); fleshy interorbital width 6.0-6.9 (6.0); bony interorbital width 4.3-5.3 (4.4); body width 11.3-13.7 (12.7); snout tip to posterior tip of retroarticular bone 13.8-16.3 (14.3); predorsal length 31.8-37.6 (33.0); prepelvic length 30.8-34.8 (31.4); posterior tip of retroarticular bone to pelvic-fin origin 17.9-19.7 (18.3); dorsal-fin origin to pelvic-fin origin 26.4-32.0 (29.6); dorsal-fin origin to middle dorsal-fin ray 29.2-34.0 (32.4); dorsal-fin origin to anal-fin origin 39.4-44.2 (41.0); pelvic-fin origin to anal-fin origin 27.0-33.5 (32.8); middle dorsal-fin ray to dorsal-fin termination 21.4-24.3 (22.7); middle dorsal-fin ray to anal-fin origin 25.0-29.0 (27.4); anal-fin origin to dorsal-fin termination 29.5-32.2 (32.2); anal-fin base length 20.8-24.3 (22.5); dorsal-fin termination to anal-fin termination 14.4-16.3 (16.3); dorsal-fin termination to caudal peduncle dorsal edge 14.5-16.5 (15.7); dorsal-fin termination to caudal peduncle ventral edge 20.6-24.0 (21.9); anal-fin termination to caudal peduncle dorsal edge 22.3-25.0 (23.9); anal-fin termination to caudal peduncle ventral edge 16.0-19.2 (18.1); first dorsal-fin spine 1.6-3.0 (2.0); second dorsal-fin spine 5.4-7.2 (6.8); third dorsal-fin spine 9.1-11.6 (9.3); first segmented dorsal-fin ray 12.7-15.2 (14.7); fourth last segmented dorsal-fin ray 15.0-18.3 (17.7); first anal-fin spine 1.6-2.7 (2.0); second anal-fin spine 5.1-7.2 (5.8); third anal-fin spine 8.5-10.6 (9.9); first segmented anal-fin ray 12.8-15.7 (14.7); fourth last segmented anal-fin ray 13.6-16.5 (16.1); third pectoral-fin ray 14.6-16.5 (16.3); pelvic-fin spine 11.3-14.7 (12.3); second segmented pelvic-fin ray 19.7-22.1 (21.7); caudal-fin length 22.8-25.0 (23.3).

Live coloration (based on photographs of specimens from the Great Barrier Reef and New Caledonia, field observations at One Tree Id, Great Barrier Reef, and notes taken from aquarium specimens; Plate 4A): head and body anterior to more-or-less vertical (often oblique, concave or convex) line near anal-fin origin magenta, remainder of body and caudal peduncle bright yellow; magenta and bright yellow regions sometimes separated by narrow pale pink to white bar; iris pinkish to magenta with purplish blue to blue suboval ring around pupil; anterior part of dorsal fin where adjacent to magenta portion of body with magenta rays and pinkish to purplish hyaline or hyaline interradial membranes; remainder of dorsal fin with bright yellow rays and yellowish hyaline interradial membranes; anal fin with bright yellow rays and yellowish hyaline interradial membranes, sometimes with one or two bright yellow stripes along basal half of fin; anal-fin spines often magenta or blue to bluish violet; caudal fin with rays and basal area bright yellow, interradial membranes becoming yellowish hyaline posteriorly; upper and lower margins of caudal fin pale blue to bluish violet or magenta; pectoral fins pinkish hyaline; pelvic fins pinkish to yellowish hyaline, fin spines pale blue to magenta.

Preserved coloration: pattern similar to live coloration, bright yellow area on body becoming pale brown to brown or pale greyish brown; magenta area on head and body becoming greyish brown to brown or grey; pale pink to white bar rarely persists, becoming pale grey to pale brown; intertemporal pore patch dusky grey; anterior part of dorsal fin dusky grey, remainder of fin either hyaline or hyaline with few scattered grey pigment spots; other fins hyaline.

HABITAT AND DISTRIBUTION: *Pictichromis coralensis* is known only from the southern and western Coral Sea, including the Great Barrier Reef (Figure 22). It has been collected and observed (pers. obs.) mainly from small caves in coral and rock reefs on reef slopes and dropoffs at depths ranging from 6 to 40 m.

COMPARISONS: As noted above under *Comparisons* for *P. aurifrons*, *P. coralensis* and *P. paccagnellae* are distinguished from congeners in live coloration: head and anterior part of body magenta, the posterior half of body abruptly bright yellow. As noted by Gill (1999a), *P. coralensis* is distinguished from *P. paccagnellae* in having higher numbers of scales in lateral series (36-43, usually 38-42 versus 33-39, usually 33-38). Modal counts for several other meristic characters differ in the two species, although overlap reduces their diagnostic usefulness: total caudal-fin rays 29-32, usually 30-31 in *P. coralensis* (versus 29-31, with a strong mode of 29 in *P. paccagnellae*); circumpeduncular scales 16-19, usually 16-18 in *P. coralensis* (versus 16 in *P. paccagnellae*); total horizontal scale rows above anal-fin origin 14-18, modally 16 in *P. coralensis* (versus 13-17, modally 15 in *P. paccagnellae*); and predorsal scales 17-22, usually 18-21 in *P. coralensis* (versus 15-21, usually 16-19 in *P. paccagnellae*). The last three characters (and scales in lateral series) reflect a general difference in scale size between the two species (scales smaller in *P. coralensis*).

In describing *P. paccagnellae*, Axelrod (1973) noted that specimens from Indonesia had a white bar between the magenta and yellow portions of the body coloration, and magenta and yellow coloration confined to fin-ray bases, whereas Power's (1969) photograph of a southern Great Barrier Reef individual (here identified as *P. coralensis*) lacked a white bar on the body and had the magenta and yellow coloration extending to the tips of the fin rays. However, based on published illustrations and photographs examined during the present study, speeimens with and without pale bars occur throughout the range of both species, and there is similar variation in the extent of the magenta and yellow coloration on fin rays. There may be a difference in bar width, however, as *P. coralensis*

apparently has at most a narrow bar, whereas it can be broad in *P. paccagnellae*. Bar presence may be associated with sex; several pairs of *P. coralensis* consisting of an individual with a bar and one without were observed on the reef slope at One Tree Id, southern Great Barrier Reef. Moreover, both *P. aurifrons* and *P. diadema* sometimes have pale pink to white stripes separating the magenta and yellow portions of the body coloration. I was unable to address a possible sex relationship in the present study of museum specimens as the bars or stripes usually disappear soon after preservation.

REMARKS: *Pictichromis coralensis* is a small species; the largest specimen examined measured 52.2 mm SL. However, as in other *Pictichromis* species, it attains a considerably larger size in aquaria (to at least 70 mm SL) probably as a result of either better nutrition or extended life-span. This species has probably been frequently illustrated, particularly in aquarium journals, but it is difficult to determine which of these illustrations refer to the very similar *P. paccagnellae*; it is usually difficult to check diagnostic scale counts on photographs of the two species. Published colour illustrations that can be assigned to *P. coralensis* are provided, however, in Power (1969), Burgess & Axelrod (1976), Fourmanoir & Laboute (1976), Coleman (1981), Gill (1993: 50) and Kuiter (1997).

Justifications for recognising this species rather than treating it as a geographic variety of *P. paccagnellae* were presented by Gill (1999a).

ETYMOLOGY: The specific epithet *coralensis* alludes to the Coral Sea, the known geographic distribution of the species.

MATERIAL EXAMINED (in addition to above type material): GREAT BARRIER REEF, AUSTRALIA: Endeavour Reef, USNM 290713, 1(0); Capricorn Group, One Tree Id, AMS I.15631-004, 1(0), 45.0 mm SL. CORAL SEA, AUSTRALIA: Ashmore Reef, AMS I.33720-042, 1(0), 13.6 mm SL.

Pictichromis diadema (Lubbock & Randall)

Diadem Dottyback
Figure 21; Plate 4B

Pseudochromis diadema Lubbock & Randall, 1978: 37, figs 1 and 4 (type locality: Pulau Tulai, West Malaysia); Schroeder, 1980: 159, fig. 164 (western Sulu Sea); Murdy et al., 1981: 1166 (list); Debelius, 1984b: 427 (colour fig.); Masuda, 1984: 74 (El Nido, Philippines; colour fig.); Kühling, 1985: 364 (colour fig.); Debelius, 1986: 21 (colour fig.); Burgess et al., 1988: pl. 154 (colour fig.); Michael, 1990a: 10 (habitat and distribution; aquarium notes); Delbeek, 1991: 18, 22 (eolour fig.; aquarium notes); Burgess et al., 1991: 205 (eolour fig.); Fosså & Nilsen, 1993: 130 (colour fig.; habitat and distribution; aquarium notes); Masuda & Allen, 1993: 136, fig. B (colour fig.); Wood et al., 1994: 124 (list; Pulau Sipidan, Sabah, Malaysia); Lieske & Myers, 1994: pl. 31, fig. 4 (colour fig.; habitat and distribution); Kuiter & Debelius, 1994: 113 (colour fig.; habitat and distribution); Gill et al., 1996: 99 (comparison; distribution); Eichler & Myers, 1997: 118 (distribution; colour fig.); Allen, 1997: 96, pl. 29-09 (deseription; distribution; col. fig.); Gill, 1999b: 2562 (key).

Pseudochromis everetti; Lange, 1986: pl. 3, fig. 15 (*nomen nudum*).

'Pseudochromis' diadema; Gill, 1999a: 81, tab. I (comparison; distribution).

DIAGNOSIS: The live coloration (dorsal contour of head and body magenta, the remainder bright yellow) distinguishes *P. diadema* from congeneric and all other pseudochromid species. The colour pattern usually persists in preservative (magenta becomes greyish brown, bright yellow becomes pale brown) but is often obscure.

DESCRIPTION (based on 18 specimens, 26.6-42.3 mm SL): dorsal-fin rays III,21-22, last 10-22 segmented rays branched (all or all but first 1-2 rays branched in specimens larger than 30 mm SL); anal-fin rays III,11-12, all or all but first segmented rays branched; pectoral-fin rays 16-17; upper procurrent caudal-fin rays 5-7; lower procurrent caudal-fin rays 5-6; total caudal-fin rays 27-30; scales in lateral series 31-37; anterior lateral-line scales 19-24; anterior lateral line terminating beneath segmented dorsal-fin ray 10-14; posterior lateral-line scales 2-8 + 0; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 11-13 + 1 + 1-3 = 14-17; circumpeduncular scales 15-16; predorsal scales 17-22; scales behind eye 1-3; scales to preopercular angle 3-5; gill rakers 5-7 + 13-15 = 18-21; pseudobranch filaments 9-12; circumorbital pores 18-24; preopercular pores 8-9; dentary pores 4; posterior interorbital pores 1.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of midway between anterior AIO and posterior nasal pores to posterior nasal pores; opercle with 4-7, usually well-developed serrations; teeth of outer ceratobranchial-1 gill rakers well developed, arranged in two rows running most of length of rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1/1/1 + 1*/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1*; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine moderately stout and pungent; second segmented pelvic-fin ray longest; caudal fin truncate to emarginate; vertebrae 10 + 16; epineurals 12-14; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw enlarged and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 11 specimens, 27.5-37.8 mm SL): head length 25.4-29.1; orbit diameter 10.0-11.8; snout length 5.8-7.3; fleshy interorbital width 5.8-7.0; bony interorbital

width 4.2-5.2; body width 11.9-15.0; snout tip to posterior tip of retroarticular bone 15.5-16.8; predorsal length 34.4-38.9; prepelvic length 31.4-35.1; posterior tip of retroarticular bone to pelvic-fin origin 17.4-20.6; dorsal-fin origin to pelvic-fin origin 26.1-30.5; dorsal-fin origin to middle dorsal-fin ray 25.8-33.0; dorsal-fin origin to anal-fin origin 39.2-43.3; pelvic-fin origin to anal-fin origin 28.3-34.1; middle dorsal-fin ray to dorsal-fin termination 20.6-23.8; middle dorsal-fin ray to anal-fin origin 24.7-28.1; anal-fin origin to dorsal-fin termination 29.4-33.1; anal-fin base length 20.2-25.1; dorsal-fin termination to anal-fin termination 14.7-16.9; dorsal-fin termination to caudal peduncle dorsal edge 14.3-16.7; dorsal-fin termination to caudal peduncle ventral edge 20.5-22.6; anal-fin termination to caudal peduncle dorsal edge 21.6-24.4; anal-fin termination to caudal peduncle ventral edge 16.0-18.2; first dorsal-fin spine 1.6-2.4; second dorsal-fin spine 5.9-7.3; third dorsal-fin spine 9.9-12.0; first segmented dorsal-fin ray 13.7-15.8; fourth last segmented dorsal-fin ray 15.3-18.5; first anal-fin spine 1.3-2.3; second anal-fin spine 5.6-6.5; third anal-fin spine 9.4-10.8; first segmented anal-fin ray 13.7-15.1; fourth last segmented anal-fin ray 14.2-16.1; third pectoral-fin ray 15.0-16.8; pelvic-fin spine 12.1-14.7; second segmented pelvic-fin ray 21.8-23.4; caudal-fin length 23.9-26.5.

Live coloration (based on photographs of specimens from Peninsular Malaysia and the Philippines and captive specimens; Plate 4B): dorsal contour of head and body above line running from snout tip (sometimes including upper and lower lips) above upper edge of operculum to point ranging from mid-dorsal base to dorsal edge of caudal peduncle magenta; remainder of head and body bright yellow; magenta and bright yellow regions sometimes separated by pale pink to white stripe; iris pinkish to magenta with purplish blue suboval ring around pupil; dorsal-fin rays magenta to violet; interradial membranes magenta to violet basally, becoming pinkish hyaline distally; anal fin violet anteriorly, becoming pinkish to yellowish hyaline posteriorly; caudal fin with rays and basal area bright yellow, interradial membranes becoming yellowish hyaline posteriorly; upper margin of caudal fin pale blue to bluish violet, sometimes with magenta and white caudal peduncle markings extending midway along upper margin of caudal fin; lower margin of caudal fin pale blue to bluish violet; pectoral fins pinkish hyaline; pelvic fins bluish violet anteriorly, yellowish hyaline posteriorly.

Preserved coloration: head and body generally pale brown; dorsal contour of head and body usually with relatively dense grey pigment; intertemporal pores surrounded by dusky grey-brown pigmentation; fins hyaline to pale greyish or brownish hyaline, except for dusky grey basal area on dorsal and anal fins.

HABITAT AND DISTRIBUTION: *Pictichromis diadema* is currently known only from Peninsular Malaysia, Sabah and from several localities in the western part of the Philippines (Figure 21). Eichler & Myers (1997) also listed it from New Guinea, but did not provide justification for this record. *Pictichromis diadema* has been collected and observed (Kuiter & Debelius, 1994) from small caves and among coral and rubble on fringing reefs and outer reef slopes and dropoffs at depths ranging from 5 to 30 m.

COMPARISONS: Differences between *P. diadema* and its congeners are discussed under *Comparisons* for *P. aurifrons*. The live coloration, as well the combination of 21-22 segmented dorsal-fin rays, 11-12 segmented anal-fin rays and 5-7 + 13-15 = 18-21 gill rakers, readily distinguishes this species from all other pseudochromines.

REMARKS: *Pictichromis diadema* is a relatively small species; the largest specimen examined measured 42.3 mm SL. This species has been illustrated frequently in aquarium journals. Good colour illustrations are given in Lubbock & Randall (1978), Schroeder (1980), Debelius (1984b, 1986), Masuda (1984), Lange (1986), Burgess et al. (1988; 1991), Delbeek (1991), Fosså & Nilsen (1993), Kuiter & Debelius (1994) and Eichler & Myers (1997). Debelius (1984b; 1986) illustrated a pale-striped specimen. This coloration may be sex related (see *Comparisons* for *P. coralensis*).

The holotype of this species was in surprisingly poor condition when examined in 1987; in particular the opercular, infraorbital and frontal bones were partially disarticulated.

Lange (1986: 34) provided a photograph of this species under the name *Pseudochromis everetti*. Efforts to locate a published description associated with *P. everetti* were unsuccessful, and it is therefore treated as a *nomen nudum*.

ETYMOLOGY: The specific epithet is from the Latin for diadem and alludes to the area of magenta on the dorsal contour of the head and body. Although *diadema* is neuter in gender, Lubbock & Randall (1978) originally proposed it as a noun in apposition.

MATERIAL EXAMINED: PENINSULAR MALAYSIA: Pulau Tulai, BPBM 20854, 1(1), 26.6 mm SL (holotype), BMNH 1978.5.13.2, 1(0), 19.0 mm SL. PHILIPPINES: Lingayen Gulf, off Tandoyong Id, LACM 42480-20, 1(1), 27.9 mm SL; Caban Id, AMS I.21918-013, 1(1), 35.4 mm SL, USNM 232040, 7(7), 27.5-37.8 mm SL (35.0 mm SL specimen subsequently cleared and stained); Caban Id, E side of Layagluyag Point, BMNH 1978.5.31.1, 1(1), 42.3 mm SL (paratype); Cuyo Ids, Cocoro Id, USNM 218625, 2(2), 30.6-35.8 mm SL; Palawan, Puerto Princesa Bay, USNM 290597, 1(0); Palawan, Puerto Princesa Bay, White Beach, USNM 290658, 5(5), 28.7-39.6 mm SL, USNM 290591, 4(0).

Pictichromis ephippiata (Gill, Pyle & Earle)

Saddled Dottyback

Figure 21; Plate 4C

Pseudochromis ephippiatus Gill, Pyle & Earle, 1996: 98, fig. 1 [type locality: "Theater Reef" (10°14'30"S 150°57'18"E), Milne Bay, Papua New Guinea]; Gill, 1999b: 2562 (key).

'Pseudochromis' ephippiatus; Gill, 1999a: 81, tab. I (comparison; distribution).

DIAGNOSIS: *Pictichromis ephippiata* is distinguished from congeners and all other pseudochromids in live coloration: head and body bright purple, with bright yellow, saddle-like marking extending from dorsal-fin base to upper caudal-fin rays, and ventral edges of caudal peduncle and sometimes of body behind anal-fin origin bright yellow. The colour pattern

persists in preservative (purple becomes greyish brown, bright yellow becomes pale brown).

DESCRIPTION (based on two specimens, 34.1-40.3 mm SL): dorsal-fin rays III,20-22, all segmented rays branched; anal-fin rays III,12, all segmented rays branched; pectoral-fin rays 17; upper procurrent caudal-fin rays 7; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 30-31; scales in lateral series 35-37; anterior lateral-line scales 21-24; anterior lateral line terminating beneath segmented dorsal-fin ray 12-14; posterior lateral-line scales 4-6 + 0; scales between lateral lines 4; horizontal scale rows above anal-fin origin 13 + 1 + 2-3 16-17; circumpeduncular scales 16; predorsal scales 20-21; scales behind eye 3-4; scales to preopercular angle 5-6; gill rakers 6-7 + 14-15 = 20-22; pseudobranch filaments 9-10; circumorbital pores 19-20; preopercular pores 8-9; dentary pores 4; posterior interorbital pores 1.

Lower lip incomplete; dorsal and anal fins without scale sheaths; predorsal scales extending anteriorly to posterior nasal pores; opercle with 8 relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed, arranged in two rows running most of length of rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1/1/1/1 + 1*/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1/1 + 1; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine moderatley stout and pungent; second segmented pelvic-fin ray longest or subequal to third; caudal fin truncate to emarginate; vertebrae 10 + 16; epineurals 13-14; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw enlarged and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-2 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL: head length 26.1-26.4; orbit diameter 10.7-12.0; snout length 6.0-6.7; fleshy interorbital width 5.9-6.2; bony interorbital width 4.4-4.7; body width 12.6-12.9; snout tip to posterior tip of retroarticular bone 15.4-16.1; predorsal length 36.2-37.8; prepelvic length 33.3-35.5; posterior tip of retroarticular bone to pelvic-fin origin 19.4-22.0; dorsal-fin origin to pelvic-fin origin 29.0-29.3; dorsal-fin origin to middle dorsal-fin ray 30.3-32.0; dorsal-fin origin to anal-fin origin 40.9-41.1; pelvic-fin origin to anal-fin origin 25.6-27.0; middle dorsal-fin ray to dorsal-fin termination 23.2-23.6; middle dorsal-fin ray to anal-fin origin 26.3-27.5; anal-fin origin to dorsal-fin termination 30.8-32.6; anal-fin base length 23.3-24.0; dorsal-fin termination to anal-fin termination 15.8-16.1; dorsal-fin termination to caudal peduncle dorsal edge 14.1-15.9; dorsal-fin termination to caudal peduncle ventral edge 21.7-22.1; anal-fin termination to caudal peduncle dorsal edge 23.6-23.8; anal-fin termination to caudal peduncle ventral edge 15.8-16.6; first dorsal-fin spine 2.3-2.7; second dorsal-fin spine 6.2-7.3; third dorsal-fin spine 9.7-10.0; first segmented dorsal-fin ray 13.9-16.1; fourth last segmented dorsal-fin ray 17.9-18.4; first anal-fin spine 2.0-2.1; second anal-fin spine 6.0-7.0; third anal-fin spine 8.9-11.1; first segmented anal-fin ray 13.6-15.5; fourth last segmented anal-fin ray 14.9-17.3; third pectoral-fin ray 16.4-17.0; pelvic-fin spine 12.4-14.1; second segmented pelvic-fin ray 21.4-22.3; caudal-fin length 24.3-26.4.

Live coloration (based on photographs of the holotype and paratype from southeastern Papua New Guinea when freshly dead, and of a live specimen from northern Sulawesi, Indonesia; Plate 4C): head and body bright pinkish purple to magenta; bright yellow saddle-shaped marking on dorsal part of body, extending from dorsal-fin base (at about fifth to last segmented ray) to upper part of caudal-fin base; ventral contour of caudal peduncle and sometimes body behind anal-fin origin bright yellow; iris purple, silvery white centrally and anteriorly, with curved, dark blue marking extending around dorsal, posterior and ventral parts of iris; dorsal-fin spines, first few segmented rays bright purple, remainder of segmented rays bright yellow; dorsal-fin membranes pinkish hyaline anteriorly and yellowish hyaline posteriorly; basal margin of dorsal fin either bright purple or bright yellow, matching adjacent body coloration; anal-fin spines bright bluish purple to blue, segmented rays bright yellow or bright purple, with fin membranes yellowish or pinkish hyaline to hyaline; caudal fin bright bluish purple on basal part of central fin rays; remainder of caudal fin bright yellow, becoming yellowish hyaline posteriorly, with upper and lower edges narrowly pale blue; pectoral fins pinkish hyaline; pelvic-fin spine bright pinkish purple, remainder of fin pinkish hyaline.

Preserved coloration: pattern similar to live coloration, purple and magenta markings becoming pinkish grey; yellow markings become pale yellow.

HABITAT AND DISTRIBUTION: *Pictichromis ephippiata* was described from two specimens from the vicinity of Milne Bay and Normandy Id, southeastern Papua New Guinea. Its range is here extended to Manado, Sulawesi, based on an underwater photograph by H. Debelius (Figure 21). It has been collected and observed (Gill et al., 1996: 99) on reef slopes and dropoffs around overhangs and rocks in 30 to 50 m.

COMPARISONS: Differences between *P. ephippiata* and its congeners are discussed under *Comparisons* for *P. aurifrons*. The live coloration, as well the combination of 20-22 segmented dorsal-fin rays, 12 segmented anal-fin rays and 6-7 + 14-15 = 20-22 gill rakers, readily distinguished this species from all other pseudochromines.

REMARKS: *Pictichromis ephippiata* is known only from two museum specimens (the holotype and paratype) and three individuals that were not collected (two from southeastern Papua New Guinea and one from Sulawesi, Indonesia). Gill et al. (1996) provide a colour photograph of the holotype. However, the photograph is misleading in that it indicates that the dorsal, anal, caudal and pelvic fins are black. This error resulted from the transposition of the original image, which had been photographed with a dark background, to a pale background. Similarly, the photograph also provides an inaccurate depiction of the shapes of the dorsal, anal, caudal and pelvic fins.

ETYMOLOGY: The specific epithet is from the Latin *ephippium*, meaning saddle or saddle cloth, and alludes to the distinctive bright yellow, saddle-like marking on the posterior part of the body.

MATERIAL EXAMINED: PAPUA NEW GUINEA: Milne Bay Province, "Theater Reef" (10°14'30"S 150°57'18"E), BPBM 37006, 1(1), 40.3 mm SL (holotype); D'Entrecasteaux Ids, off Normandy Id (10°15'06"S 151°02'54"E), BPBM 36978, 1(1), 34.1 mm SL (paratype).

***Pictichromis paccagnellae* (Axelrod)**
Royal Dottyback
Figure 22; Plate 4D

Pseudochromis paccagnellae Axelrod, 1973: 5, 2 unnumbered figs (type locality: Indonesia); Lubbock & Goldman, 1974: 109 (New Hebrides); Mayland, 1975: 148, fig. 88 (aquarium notes); Burgess & Axelrod, 1975: figs 158-161 (colour figs; Marau, Solomon Ids and Santo, New Hebrides); Lubbock & Randall, 1978: fig. 3 (colour fig.; Indonesia); Lubbock, 1980: 826 (Admiralty Ids and New Britain, Papua New Guinea); Allen & Russell, 1986: 85 (Rowley Shoals and Scott Reef, Timor Sea); Kuiter, 1992: 42, fig. e (colour fig.; Flores); Gill, 1993: 48 (colour fig. on p. 53 only; habitat and distribution); Kuiter & Debelius, 1994: 113 [colour fig.; habitat and distribution in part (excluding Australian record)]; Gill et al., 1996: 99 (comparison; distribution); Steene, 1998: 155 (colour fig.; Bali, Indonesia); Myers, 1999: 121, 297, pl. 48E (description; distribution; colour fig.); Gill, 1999b: 2562 (key).

'Pseudochromis' paccagnellae; Gill, 1999a: 81, tab. I (comparison; distribution).

DIAGNOSIS: *Pictichromis paccagnellae* is distinguished from congeners in having 33-39, usually 33-38 scales in lateral series in combination with the following live coloration: head and body anterior to a more-or-less vertical line through vicinity of anal-fin origin magenta, the remainder of body bright yellow. The coloration usually persists in preservative (magenta becomes greyish brown to grey or brown, bright yellow becomes pale brown to greyish brown), but is often difficult to perceive.

DESCRIPTION (based on 71 specimens, 22.3-46.0 mm SL): dorsal-fin rays III,21-22, last 2-22 segmented rays branched (all or all but first 1-2 branched in specimens larger than about 30 mm SL); anal-fin rays III,11-13, last 3-13 segmented rays branched (all or all but first branched in specimens larger than 25 mm SL); pectoral-fin rays 15-18; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 6-8; total caudal-fin rays 29-31; scales in lateral series 33-39; anterior lateral-line scales 17-27; anterior lateral line terminating beneath segmented dorsal-fin ray 11-16; posterior lateral-line scales 0-9 + 0-1; scales between lateral lines 3-5; horizontal scale rows above anal-fin origin 10-13 + 1 + 1-3 = 13-17; circumpeduncular scales 16; predorsal scales 15-21; scales behind eye 2-5; scales to preopercular angle 3-6; gill rakers 5-8 + 14-17 = 19-24; pseudobranch filaments 8-12; circumorbital pores 16-26; preopercular pores 7-11; dentary pores 4-5; posterior interorbital pores 1.

Lower lip complete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of anterior AIO pores to posterior nasal pores; opercle with 4-9, usually relatively well-developed serrations; teeth of outer ceratobranchial-1 gill rakers well developed, arranged in two rows running most of length of rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1/1 + 1/1/1/1 or S/S/S + 3/1 + 1/1/1/1/1/1/1/1 + 1*/1/1; dorsal-fin spines moderately stout to stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1/1 + 1* or 3/1/1/1 + 1/1 + 1; anal-fin spines moderately stout to stout and pungent, the second spine stouter than the third; pelvic-fin spine moderately stout to stout and pungent; second segmented pelvic-fin ray longest; caudal fin truncate to emarginate; vertebrae 10 + 16; epineurals 12-14; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw enlarged and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 28 specimens, 22.3-46.0 mm SL): head length 24.0-29.3; orbit diameter 8.8-12.5; snout length 5.8-7.0; fleshy interorbital width 5.8-7.3; bony interorbital width 4.1-5.4; body width 11.6-14.3; snout tip to posterior tip of retroarticular bone 14.6-16.7; predorsal length 32.9-37.7; prepelvic length 31.4-36.4; posterior tip of retroarticular bone to pelvic-fin origin 17.6-21.2; dorsal-fin origin to pelvic-fin origin 27.6-32.0; dorsal-fin origin to middle dorsal-fin ray 28.7-32.4; dorsal-fin origin to anal-fin origin 38.3-43.3; pelvic-fin origin to anal-fin origin 27.7-35.7; middle dorsal-fin ray to dorsal-fin termination 21.6-28.9; middle dorsal-fin ray to anal-fin origin 24.0-29.7; anal-fin origin to dorsal-fin termination 29.3-32.9; anal-fin base length 20.7-24.5; dorsal-fin termination to anal-fin termination 14.8-18.4; dorsal-fin termination to caudal peduncle dorsal edge 13.3-16.6; dorsal-fin termination to caudal peduncle ventral edge 20.0-22.4; anal-fin termination to caudal peduncle dorsal edge 21.5-26.1; anal-fin termination to caudal peduncle ventral edge 15.0-19.2; first dorsal-fin spine 1.8-3.8; second dorsal-fin spine 5.3-8.5; third dorsal-fin spine 8.9-12.6; first segmented dorsal-fin ray 12.4-15.1; fourth last segmented dorsal-fin ray 15.9-19.2; first anal-fin spine 1.6-3.1; second anal-fin spine 5.3-8.5; third anal-fin spine 7.4-11.8; first segmented anal-fin ray 10.8-15.3; fourth last segmented anal-fin ray 14.3-17.8; third pectoral-fin ray 14.5-17.0; pelvic-fin spine 11.2-15.2; second segmented pelvic-fin ray 21.0-23.8; caudal-fin length 22.2-26.4.

Live coloration (based on photographs of specimens from Indonesia, Belau, Papua New Guinea, the Solomon Ids and Vanuatu, and observations on captive specimens; Plate 4D): head and body anterior to more-or-less vertical (often oblique,

concave or convex) line near anal-fin origin magenta, remainder of body and caudal peduncle bright yellow; magenta and bright yellow regions sometimes separated by narrow to broad pale pink to white bar; iris pinkish to magenta with purplish blue suboval ring around pupil; anterior part of dorsal fin where adjacent to magenta portion of body with magenta rays and pinkish to purplish hyaline interradial membranes; remainder of dorsal fin with bright yellow rays and yellowish hyaline interradial membranes; anal fin with bright yellow rays and yellowish hyaline interradial membranes, fin spines often magenta or blue to bluish violet; caudal fin with rays and basal area bright yellow, interradial membranes becoming yellowish hyaline posteriorly; upper and lower margins of caudal fin pale blue to bluish violet or magenta; pectoral fins pinkish hyaline; pelvic fins pinkish to yellowish hyaline, fin spines pale blue to magenta.

Preserved coloration: pattern similar to live coloration, bright yellow area on body becoming pale brown to brown or pale greyish brown; magenta area on head and body becoming greyish brown to brown or grey; pale pink to white bar rarely persists, becoming pale grey to pale brown; intertemporal pore patch dusky grey; anterior part of dorsal fin dusky grey, remainder of fin either hyaline or hyaline with few scattered grey pigment spots; other fins hyaline.

HABITAT AND DISTRIBUTION: *Pictichromis paccagnellae* is relatively widely distributed throughout the southern tropical portions of the eastern Indian and western Pacific Oceans, from Indonesia and the Timor Sea east to the Solomon Ids and Vanuatu; it has also been recently photographed in Belau by Myers (1999) and M. Kasai (pers. comm.) (Figure 22). Records of *P. paccagnellae* from the Great Barrier Reef, western and southern Coral Sea and New Caledonia are based on the very similar *P. coralensis*. *Pictichromis paccagnellae* has been collected and observed (Gill et al., 1996) mainly from small caves in coral and rock reefs on reef slopes and dropoffs at depths ranging from 2 to 70 m.

COMPARISONS: Differences between *Pictichromis paccagnellae* and its congeners except *P. coralensis* are discussed under *Comparisons* for *P. aurifrons*; characters distinguishing it from *P. coralensis* are discussed under *Comparisons* for that species. The live coloration of *P. paccagnellae* readily distinguishes it from all other pseudochromines, as does the presence of low segmented dorsal- and anal-fin ray counts (21-22 and 11-13, respectively) in combination with high gill raker counts (5-8 + 14-17 = 19-24).

REMARKS: *Pictichromis paccagnellae* is a relatively small species; the largest specimen examined measured 46.0 mm SL. However, it does attain much larger sizes in aquaria (to at least 70 mm SL). As noted above for *P. coralensis*, this probably results from either better nutrition or an extended life-span. This species has probably been frequently illustrated, particularly in aquarium journals, but, as noted under *Remarks* for *P. coralensis*, it is usually difficult to check scale counts on photographs that would allow *P. paccagnellae* to be separated from the very similar *P. coralensis*. Published colour illustrations that can be assigned to *P. paccagnellae* are provided, however, in Axelrod (1973), Burgess & Axelrod (1975), Lubbock & Randall (1978), Gill (1993: 53), Steene (1998) and Myers (1999).

Pictichromis paccagnellae is sympatric with *P. porphyrea* in Vanuatu (Lubbock & Goldman, 1974: 110), Belau, and probably also in eastern Indonesia and off northern Papua New Guinea, given the proximity of collections of the two species (Figure 22). It is also sympatric with *P. ephippiata* in northern Sulawesi and southern Papua New Guinea.

ETYMOLOGY: The specific name is for the Pacagnella family, aquarium fish wholesalers in Bologna, Italy, who supplied Axelrod with the type specimens.

MATERIAL EXAMINED: INDONESIA: USNM 20841, 1(1), 39.0 mm SL (holotype); Sulawesi, 15 km W of Manado, BMNH 1973.12.20.226-227, 2(2), 27.1-35.5 mm SL; Sulawesi, Kabeana Id, off NE tip of Big Damalawa Islet, Tallabassi Bay, USNM 290515, 5(5), 25.0-41.4 mm SL; Bonerate Id, S side of Telerang Islet, BPBM 31526, 3(2, 28.3-32.7 mm SL), 14.6-32.7 mm SL; Sumbawa, Moyo Id, CAS 62452, 1(1), 40.8 mm SL; Sumbawa, Satonda Id, CAS 62461, 1(1), 25.2 mm SL; Banda Ids, W of northern-most tip of Great Banda Id, USNM 290503, 2(2), 37.2-37.6 mm SL. NORTH WEST SHELF, AUSTRALIA: Ashmore Reef, East Pass, WAM P.29049-015, 6(6), 29.1-40.0 mm SL; Scott Reef, NTM S.11373-021, 3(2, 39.3-42.8 mm SL), 12.9-42.8 mm SL; Rowley Shoals, Mermaid Reef, WAM P.28034-003, 2(2), 37.9-40.4 mm SL; Rowley Shoals, northern tip of Clerke Reef, WAM P.27663-005, 3(3), 22.3-44.5 mm SL; Rowley Shoals, Clerke Reef, 2 km SE of Bedwell Id, WAM P.28027-021, 8(7, 23.7-43.5 mm SL), 23.7-43.5 mm SL. PAPUA NEW GUINEA: Ninigo Ids, channel between Pelleluku Group and Ninigo Group, USNM 290448, 4(0); Hermit Ids, Pechu Id, USNM 290834, 5(0); Hermit Ids, Amot Id, USNM 290701, 18(12, 25.6-39.7 mm SL), 15.5-39.7 mm SL; New Britain, Nodup, BMNH 1983.3.25.191, 1(1), 42.6 mm SL, BMNH 1983.3.25.215-225, 11(11), 23.7-46.0 mm SL; Madang Harour, outer reef slope off Kranket Id, USNM 285462, 4(0); Egum Atoll, Yanaba Id, AMS I.17035-001, 2(2), 37.8-45.2 mm SL. SOLOMON IDS: Alite Reef, AMS I.17496-011, 4(4), 35.8-40.4 mm SL, CAS 56564, 1(1), 41.5 mm SL; Florida Id, Tanavulu Point, AMS I.17500-004, 4(4), 33.7-44.1 mm SL; Guadalcanal, 12 km W of Honiara, ROM 42345, 1(1), 31.2 mm SL; Stewart Ids, off Matuiloto Id, USNM 352602, 1(1), 35.3 mm SL.

Pictichromis porphyrea (Lubbock & Goldman)

Strawberry Dottyback

Figure 22; Plate 4E

Pseudochromis porphyreus Lubbock & Goldman, 1974: 107, pl. 1 (type locality: Ishigaki, Ryukyu Ids); Masuda et al., 1975: 225, fig. 53j (description, erroneously record eight dorsal-fin spines; distribution); Fourmanoir & Laboute, 1976: 285 (colour fig.; New Hebrides); Lubbock & Randall, 1978: fig. 2 (colour fig.); Carlson, 1981: 44 (colour fig.; ecological and aquarium notes); Wass, 1984: 12 (list); Debelius, 1984b: 427 (colour fig.); Masuda, 1984: 74 (Kerama Id, Japan); Wheeler, 1985: pl. 270 (colour fig.); Kühling, 1985: 364 (colour fig.); Debelius, 1986: 21 (colour fig.); Burgess et al., 1988: pl. 154 (colour fig.); Myers, 1989: 114, 274, pl. 37f (description; distribution; colour fig.);

Michael, 1990a: 8 (colour figs, habitat and distribution; aquarium notes); Burgess et al., 1991: 205 (colour fig.); Fosså & Nilsen, 1993: 132 (colour figs; habitat and distribution; aquarium notes); Masuda & Allen, 1993: 136, fig. C (colour fig.); Shao, 1994: 301, fig. 77-8 (description; colour fig.); Lieske & Myers, 1994: pl. 31, fig. 2 (colour fig.; habitat and distribution); Kuiter & Debelius, 1994: 113 (colour fig.; habitat and distribution); Masuda & Kobayashi, 1994: 126, fig. 5 (colour fig.); Gill et al., 1996: 99 (comparison; distribution); Eichler & Myers, 1997: 118 (distribution; colour fig.); Allen, 1997: 96, pl. 29-08 (description; distribution; col. fig.); Myers, 1999: 121, 297, pl. 48G (description; distribution; colour fig.); Gill, 1999b: 2576 (description; distribution; fig.).

Pseudochromis sp.; Wheeler, 1975: pl. 270 (colour fig.).

'Pseudochromis' porphyreus; Gill, 1999a: 81, tab. I (comparison; distribution).

DIAGNOSIS: *Pictichromis porphyrea* is distinguished from congeners in having a uniform purple to magenta live coloration (pale brown to purplish grey or brown in preservative, with dusky grey to brown pigmentation tracing margins of myomeres usually present on posterior part of body above anal fin).

DESCRIPTION (based on 44 specimens, 22.0-50.8 mm SL): dorsal-fin rays III,21-22, last 5-22 segmented rays branched (all or all but first 1-2 branched in specimens larger than 30 mm SL); anal-fin rays III,10-12, last 4-12 segmented rays branched (all or all but first branched in specimens larger than 25 mm SL); pectoral-fin rays 16-19; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 5-7; total caudal-fin rays 28-31; scales in lateral series 33-40; anterior lateral-line scales 19-28; anterior lateral line terminating beneath segmented dorsal-fin ray 11-16; posterior lateral-line scales 0-10 + 0-1; scales between lateral lines 3-5; horizontal scale rows above anal-fin origin 11-13 + 1 + 1-3 = 14-17; circumpeduncular scales 16-18; predorsal scales 15-21; scales behind eye 2-3; scales to preopercular angle 4-6; gill rakers 5-8 + 13-15 = 18-23; pseudobranch filaments 8-12; circumorbital pores 15-26; preopercular pores 7-11; dentary pores 4-5; posterior interorbital pores 1.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from posterior AIO pores to posterior nasal pores; opercle with 4-11, usually relatively well-developed serrations; teeth of outer ceratobranchial-1 gill rakers well developed, in 2 rows running most of length of rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1/1/1 + 1*/1/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1/1 + 1/1/1 + 1/1 + 1; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine moderately stout and pungent; second segmented pelvic-fin ray longest; caudal fin truncate to emarginate; vertebrae 10 + 16; epineurals 12-13; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw enlarged and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 19 specimens, 22.5-50.8 mm SL): head length 24.3-29.3; orbit diameter 8.9-12.4; snout length 6.1-6.9; fleshy interorbital width 5.9-7.1; bony interorbital width 3.9-5.3; body width 11.5-14.2; snout tip to posterior tip of retroarticular bone 14.8-16.6; predorsal length 33.4-37.3; prepelvic length 31.4-33.7; posterior tip of retroarticular bone to pelvic-fin origin 17.3-20.7; dorsal-fin origin to pelvic-fin origin 27.6-31.8; dorsal-fin origin to middle dorsal-fin ray 29.2-33.1; dorsal-fin origin to anal-fin38.7-43.0; pelvic-fin origin to anal-fin origin 27.3-34.3; middle dorsal-fin ray to dorsal-fin termination 20.8-25.8; middle dorsal-fin ray to anal-fin origin 24.4-28.5; anal-fin origin to dorsal-fin termination 28.4-32.6; anal-fin base length 19.7-24.0; dorsal-fin termination to anal-fin termination 14.7-17.7; dorsal-fin termination to caudal peduncle dorsal edge 13.8-17.0; dorsal-fin termination to caudal peduncle ventral edge 19.2-22.8; anal-fin termination to caudal peduncle dorsal edge 21.5-24.5; anal-fin termination to caudal peduncle ventral edge 15.3-19.5; first dorsal-fin spine 1.6-2.6; second dorsal-fin spine 3.5-7.1; third dorsal-fin spine 8.4-10.5; first segmented dorsal-fin ray 12.6-14.2; fourth last segmented dorsal-fin ray 16.0-18.0; first anal-fin spine 1.6-2.4; second anal-fin spine 4.9-6.4; third anal-fin spine 6.8-10.3; first segmented anal-fin ray 12.2-14.5; fourth last segmented anal-fin ray 14.4-16.5; third pectoral-fin ray 13.9-16.5; pelvic-fin spine 11.1-13.3; second segmented pelvic-fin ray 20.5-23.0; caudal-fin length 22.6-25.2.

Live coloration (based on photographs of specimens from the Ryukyu Ids, Indonesia, Papua New Guinea, Belau, Fiji and American Samoa, and captive specimens; Plate 4E): head and body purple to magenta; iris magenta to pale blue with blue suboval ring around pupil; scales of flanks sometimes pale pink basally; dorsal and anal fins pink to magenta basally, remainder of fin pinkish to purplish hyaline with pinkish orange to magenta rays; basal and central portions of caudal fin magenta (giving rounded appearance to fin), remainder pinkish hyaline to hyaline; pectoral and pelvic fins pinkish hyaline to hyaline, pelvic fin spines sometimes mauve to magenta.

Preserved coloration: head and body pale brown to purplish-grey or brown; dusky grey to brown pigmentation tracing margins of myomeres usually present on posterior part of body above anal fin; dorsal and anal fins greyish or brownish hyaline to hyaline, sometimes darker basally; caudal fin pale brown to purplish grey or brown basally, remainder of fin greyish or brownish hyaline to hyaline; pectoral fins hyaline; pelvic fins brownish hyaline to hyaline.

HABITAT AND DISTRIBUTION: *Pictichromis porphyrea* is relatively widely distributed throughout the western Pacific, from the Ryukyu Ids south through the eastern Philippines and eastern Indonesia, to Fiji in the south, east to American Samoa and Kiribati. It also occurs at the Widi Ids, Indonesia

(based on a photograph by J.E. Randall), north of Sorong and Biak, Irian Jaya (based on sight records and photographs by G. Barrall), Manus Id, Papua New Guinea (based on a photograph by G.R. Allen) and possibly at Enewetak in the Marshall Ids (based on a sight record from a submersible in 61 metres by Thresher & Colin, 1986; Figure 22). It has been collected primarily from small caves and among coral and rubble on reef slopes and dropoffs at depths ranging from 3 to 65 m.

COMPARISONS: Differences between *P. porphyrea* and other *Pictichromis* species are discussed under *Comparisons* for *P. aurifrons*. The only other pseudochromine with a magenta live coloration is *Pseudochromis fridmani* from the Red Sea. However, *P. fridmani* differs from *P. porphyrea* in having a dark grey stripe extending from the snout tip to the eye, a small dusky to dark grey spot on the opercular flap and vertically elongate dark blue markings on each body scale. It further differs in having more segmented dorsal- and anal-fin rays (25-27 and 14-15 versus 21-22 and 10-12, respectively).

REMARKS: *Pictichromis porphyrea* is a relatively small species; the largest wild-caught specimen examined measured 50.8 mm SL. However, as for *P. coralensis* and *P. paccagnellae*, it does attain larger sizes in captivity (to at least 65 mm SL). Like other *Pictichromis* species, *P. porphyrea* is a popular aquarium fish and has therefore been extensively illustrated in the popular aquarium fish literature. Live colour illustrations of it at are provided, for example, in Lubbock & Goldman (1974), Masuda et al. (1975), Fourmanoir & Laboute (1976), Lubbock & Randall (1978), Masuda (1984), Myers (1989, 1999), Kuiter & Debelius (1994) and Eichler & Myers (1997).

ETYMOLOGY: The specific name is from the Greek *porphyra*, purple, alluding to the distinctive live coloration.

MATERIAL EXAMINED: No locality data (aquarium trade specimen), AMS I.31554-004, 65.5 mm SL (cleared and stained). RYUKYU IDS, JAPAN: Okinawa, Onna Point, BPBM 11992, 1(1), 49.8 mm SL; Ishigaki, BPBM 8737, 1(1), 45.2 mm SL (holotype), BMNH 1973.5.15.1, 1(1), 44.3 mm SL (paratype), USNM 210325, 1(0), 40.5 mm SL. PHILIPPINES: Negros Id, E of Bais, USNM 290832, 1(0); Cebu Id, Caceres Reef, near Huisan Point, USNM 290594, 3(3), 39.5-42.7 mm SL; Siquijor Id, 1 km W of Larena, USNM 290595, 7(7), 34.0-44.4 mm SL. INDONESIA: Ambon Id, off Morilla, BPBM 19360, 3(3), 41.0-46.7 mm SL; Saparua Id, off Kampunghamu, USNM 210243, 3(3), 23.4-26.4 mm SL; Pulau Pulau Penyu, CAS 62521, 1(1), 38.2 mm SL. BELAU (PALAU): Malakal Id, BPBM 20973, 1(0), 21.0 mm SL; Apurashokoru Id, AMS I.17191-001, 1(1), 39.8 mm SL (paratype), BPBM 9919, 2(0), 36.8-37.6 mm SL (paratypes); Augulpelu Reef, BPBM 9928, 13(0), 20.0-39.6 mm SL, BPBM 13847, 4(4), 22.0-35.4 mm SL, BPBM 31462, 1(0), 17.0 mm SL. KIRIBATI (GILBERT IDS): Abaiang Atoll, off Bolton Point, AMS I.22024-001, 3(3), 31.2-39.7 mm SL. FIJI: SW margin of Charybdis Reef, USNM 236657, 3(3), 31.5-38.3 mm SL; NW tip of Great Astrolabe Reef, USNM 242116, 2(0); Astrolabe Reef, Dravuvi Id, ROM 46739, 1(1), 46.5 mm SL; Viti Levu, Bay of Islands, Labiko Id, AMS I.17510-005, 1(1), 50.8 mm SL; Lau Group, Navutu-i-ra, USNM 236658, 5(5), 23.2-33.3 mm SL. AMERICAN SAMOA: Tutuila, off Fagaitua Bay, BPBM 15013, 3(0), 21.5-37.0 mm SL; Tutuila, Fagatele Bay, BPBM 17504, 1(1), 33.1 mm SL; Tutuila, Steps Point, AMS I.25445-001, 5(5), 24.3-36.5 mm SL.

PSEUDOCHROMIS Rüppell

Pseudochromis Rüppell, 1835: 8 [type species: *Pseudochromis olivaceus* Rüppell by subsequent designation of Bleeker (1875: 2)].

Labristoma Swainson, 1839: 230 [type species: *Pseudochromis olivaceus* Rüppell by subsequent designation of Swain (1883: 275)].

Leptochromis Bleeker, 1875: 14 [type species: *Pseudochromis melanotaenia* Bleeker (= *Pseudochromis tapeinosoma* Bleeker) by subsequent designation of Bleeker (1876: 321)].

Onar De Vis, 1885: 875 [type species: *Onar nebulosum* De Vis (= *Pseudochromis fuscus* Müller & Troschel) by monotypy].

Bartschina Fowler, 1931b: 18 (type species: *Dampieria bitaeniata* Fowler by original designation and monotypy).

Devisina Fowler, 1931b: 26 (type species: *Pseudochromis quinquedentatus* McCulloch by original designation).

DIAGNOSIS: *Pseudochromis* is not definable on the basis of any unique combination of external characters. Osteologically it is distinct among pseudochromines in having the following character combination: two anterior cartilage heads present on infrapharyngobranchial 2; mesopterygoid without broad dorsomedial lamina; posterior lamina on first dorsal-fin pterygiophore confined to distal end of bone; and eight or fewer consecutive dorsal-fin pterygiophores inserting in a 1:1 association with interneural spaces immediately behind neural spine 4.

REMARKS: Until recently, almost all pseudochromines were placed in this genus; the remaining species were placed in *Labracinus*. The genus is redefined here as a result of removal of *Assiculus, Cypho* and *Ogilbyina* from junior synonymy, and the description of the new genera *Manonichthys, Oxycercichthys, Pholidochromis* and *Pictichromis* (species of which had been previously placed in *Pseudochromis*). *Pseudochromis* is still probably paraphyletic; it includes roughly two-thirds of the pseudochromine species and is not definable on the basis of any synapomorphic characters. Therefore, the present composition of the genus should be regarded as provisional.

No external characters or combination of external characters were found to define *Pseudochromis*. External identification of the genus is therefore possible only through a process of elimination of all other pseudochromine genera. The genus is distinctive osteologically, however, in having the following combination of characters: two anterior cartilage heads present on infrapharyngobranchial 2 (versus a single head in *Assiculoides, Assiculus* and *Pictichromis*); mesopterygoid without a broad dorsomedial lamina (versus broad in *Pictichromis* and *Manonichthys*); posterior lamina on the first dorsal-fin pterygiophore confined to the distal end of the bone (versus running all or most of the bone's length in *Assiculoides, Assiculus, Labracinus, Ogilbyina, Oxycercichthys* and

Pholidochromis); and eight or fewer consecutive dorsal-fin pterygiophores inserting in a 1:1 association with interneural spaces immediately behind neural spine 4 (versus 11-21 in *Assiculoides, Assiculus, Cypho, Labracinus, Pholidochromis* and *Oxycercichthys*).

Leptochromis Bleeker (1875) is here regarded as a synonym of *Pseudochromis* but may eventually prove to be either a valid genus or subgenus for the "*P. tapeinosoma* complex" (Gill & Winterbottom, 1993: 5). Regan (1920: 47) described *Leptochromis* as a new genus of African Cichlidae for *Paratilapia calliura* Boulenger. Whitley (1929: 112) noted that Regan's genus is a homonym and proposed *Reganochromis* as a replacement. As noted by Burgess (1977), Whitley's paper has been overlooked by many cichlid workers and *Leptochromis* Regan is still used occasionally in the popular and scientific literature (e.g., Fryer and Iles, 1972; Liem, 1981).

Under an account for *Pseudochromis fuscus*, Day (1888: 791) listed *Malacocanthus*, a manuscript name proposed by S.R. Tickell for "two varieties of a species" (*M. bicolour* and *M. coccinicauda*) from Burma. Myers (1951) drew attention to the various Tickell manuscript names published by Day (1888), stating that they were "validly published and available for use if Day's identifications prove to be wrong, if preoccupation makes older names unusable, or if generic, specific, or subspecific splitting occurs." In his account for *Malacocanthus*, Myers went on to say that it was "apparently a synonym of *Pseudochromis*, but perhaps available as a subgenus." Myers designated *M. coccinicauda* type species for *Malacocanthus*. As noted by Whitehead & Talwar (1976) and Eschmeyer & Bailey (1990), Day (1888) first published *Malacocanthus* as a junior synonym of *Pseudochromis*. Contrary to Myers (1951), it is therefore not available unless it was treated as an available name and used either for a taxon or as a senior homonym prior to 1961 (International Commission on Zoological Nomenclature, 1999: Article 11.6). As Myers did not treat *Malacocanthus* as clearly available, only that it was "perhaps" available, and as I have not been able to loeate other pre-1961 references that treat it as available, *Malacocanthus* is here regarded as unavailable.

Although most authors have regarded *Pseudochromis* as masculine, some authors have treated the name as feminine, mainly due to variable application of gender to the Greek stem *-chromis*. The International Commission on Zoological Nomenclature has ruled (Opinion 1417) that the pomacentrid genus *Chromis* Cuvier in Desmarest, 1814, is feminine due to gender assignment in the original work, but that this ruling does not define gender for other genera ending in *-chromis*. Since both of the species (*P. flavivertex* and *P. olivaceus*) originally included in *Pseudochromis* by Rüppell (1835) have masculine terminations, the genus is here regarded as masculine due to original gender assignment. Note however that elswhere in this revision two newly described genera with *-chromis* terminations, *Pictichromis* and *Pholidochromis*, are treated as feminine.

ETYMOLOGY: The generic name is from the Greek *pseudos*, fallacy or lie, and *chromis*, a pomacentrid fish, with reference to the apparent similarity of the type species and *P. flavivertex* to *Chromis* species. Gender is masculine (see *Remarks* above).

Key to species of *Pseudochromis*

1a. Palatine tooth patches directed strongly inward behind posterolateral arms of vomerine tooth patch (Figure 23A) .2
1b. Palatine tooth patches more-or-less contiguous with posterolateral arms of vomerine tooth patch (Figure 23B) ..7

2a. Upper part of body with a dark longitudinal stripe 3
2b. No dark stripe on upper part of body 4

3a. Dark stripe on upper part of body extends below anterior lateral line to upper caudal-fin rays; scales in lateral series 33-34; scales between lateral lines 3; circumpeduncular scales 16 (Culion, Philippines) ..... *P. colei*
3b. Dark stripe on upper part of body angles upwards to cross middle of anterior lateral line and join basal stripe on middle part of dorsal fin; scales in lateral series 38-42; scales between lateral lines 4-6; cireumpeduncular scales 20-24 (Indonesia and Philippines) ..... *P. perspicillatus*

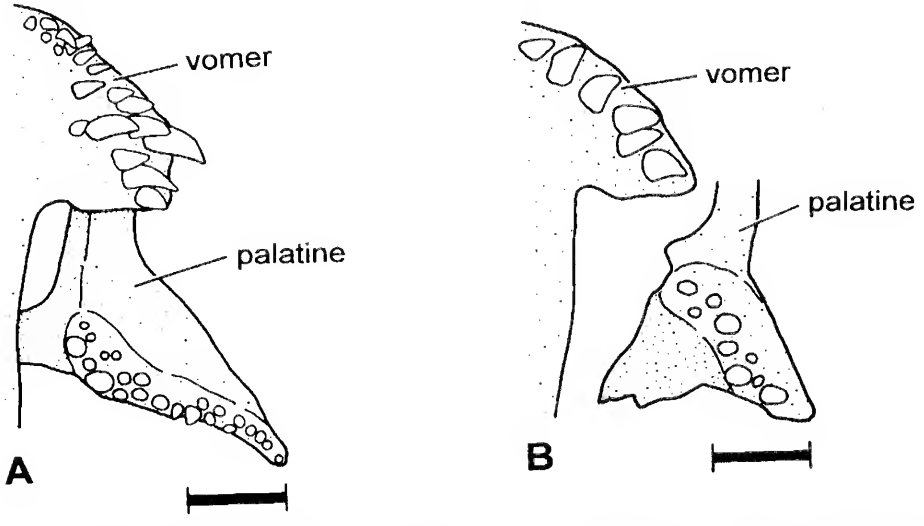

Figure 23. Ventral view of left anterior portion of vomer and posterior portion of left palatine of: A) *Pseudochromis quinquedentatus*, AMS I.19337-003, 50.0 mm SL; B) *P. fuscus*, AMS I.18469-044, 48.0 mm SL. Scale = 0.5 mm.

4a. No dark bar in front of each anterior nostril; posterodorsal corner of operculum without dark spot; caudal fin rounded (northern Australia) ..... *P. quinquedentatus*
4b. Dusky to prominent dark bar in front of each anterior nostril; indistinct to distinct grey to black spot present on posterodorsal corner of operculum; caudal fin rounded, becoming strongly emarginate in large specimens 5

5a. Anal fin with broad dark grey-brown (dark grey to black in life) distal stripe; pelvic fins pale, broadly edged anteriorly with dark grey-brown (dark grey to black in life); pale bar extending from behind eye to posterior edge of upper jaw (Indonesia) ..... *P. steenei*
5b. Coloration not as above 6

6a. Dark spot on operculum indistinct and small, smaller than pupil; preopercle edge not dark (North West Shelf, Australia) ..... *P. howsoni*
6b. Dark spot on operculum distinct and large, approximately equal to eye size; preopercle edge dark (Philippines) ..... *P. moorei*

7a. Caudal fin forked (Red Sea) ..... *P. dixurus*
7b. Caudal fin rounded, truncate, emarginate or pointed 8

8a. Gill rakers 6-8 + 15-17 = 21-25; dorsal-fin origin to pelvic-fin origin 20.8-25.2 % SL 9
8b. Character combination not as above 10

9a. Head and body magenta (pinkish brown in preservative) with a vertically elongate dark blue (dark grey to dark brown in preservative) mark on each body scale; scales below anterior lateral line 11-13; circumpeduncular scales 16-18 (northern and central Red Sea) ..... *P. fridmani*
9b. Head and body pale pinkish brown to white, dark olive to dark olive-brown on dorsal contour with a broad black stripe along midside of head and body and a broad black stripe on ventral part of head and body; scales below anterior lateral line 14-16; circumpeduncular scales 19-20 (usually 20) (southern Red Sea and Gulf of Aden) ..... *P. sankeyi*

10a. Circumpeduncular scales 16-23 (rarely fewer than 18) 11
10b. Circumpeduncular scales 14-17 (rarely 14-15 or 17) ... 40

11a. Upper infraorbital, supraotic, upper preopercular and posttemporal pores surrounded by prominent dark grey to black (dark brown to black in preservative) spots 12
11b. No prominent dark spots surrounding head pores 13

12a. Scales in lateral series 41-47; anterior lateral-line scales 29-34; circumorbital pores 20-76; preopercular pores 11-30 (E coast of Africa) ..... *P. dutoiti*
12b. Scales in lateral series 35-42; anterior lateral-line scales 15-25; circumorbital pores 12-15; preopercular pores 7-10 (Red Sea) ..... *P. springeri*

13a. Segmented dorsal-fin rays 29-31, usually 30; scales in lateral series 51-67, usually 53 or more 14
13b. Character combination not as above 15

14a. In preservative, sides of body without scattered dark, punctate spots; circumpeduncular scales 20-22, usually 20; scales between lateral lines 3 (Oman) ..... *P. omanensis*
14b. In preservative, sides of body with scattered small, dark grey to black (bright blue in life), punctate spots; circumpeduncular scales 20-25, rarely 20; scales between lateral lines usually 4, rarely 3 or 5 (Persian Gulf and Arabian Sea) ..... *P. persicus*

15a. Prominent dark grey to black spot present on opercular flap 16
15b. No prominent dark grey to black spot on opercular flap 24

16a. Predorsal scales 26-40; dorsal-fin origin to pelvic-fin origin 30.7-34.8 % SL 17
16b. Predorsal scales 12-28; dorsal-fin origin to pelvic-fin origin 21.5-30.9 % SL 18

17a. Caudal fin rounded to truncate, rarely weakly emarginate; sides of body either without dark markings or with rounded or vertically elongate dark spots (north-western Indian Ocean excluding Red Sea) ..... *P. linda*
17b. Caudal fin usually weakly to strongly emarginate, sometimes rounded to truncate; sides of body with a few to many dark grey to black (dark blue in life) crescentic marks (Red Sea) ..... *P. olivaceus*

18a. Segmented anal-fin rays 14-16, usually 15; segmented dorsal-fin rays 25-27, usually 26; dorsal contour of head and body abruptly darker than remainder of head and body or with entire head and body more-or-less uniform dark greyish brown 19
18b. Segmented anal-fin rays 15-20, rarely 15; segmented dorsal-fin rays 26-32, rarely 26; coloration not as above .. 22

19a. Caudal fin emarginate to strongly emarginate; no dark spots on dorsal fin (Comores Ids) *P. aureolineatus* sp. nov.
19b. Caudal fin rounded to truncate; small dark spots present on dorsal fin 20

20a. Pectoral-fin rays 18-20, rarely 18 or 20; head and body sometimes uniform dark greyish brown (E coast of Africa) . ..... *P. melas*
20b. Pectoral-fin rays 17-19, usually 18; coloration not as above 21

21a. No dark spots on anal fin; middle dorsal-fin ray to anal-fin origin 25.7-27.5 % SL (Red Sea) ..... *P. pesi*
21b. Dark spots present on anal fin; middle dorsal-fin ray to anal-fin origin 23.1-25.0 % SL (off Obia, Somalia, and southern Oman) ..... *P. punctatus*

22a. Sides of body with scattered small dark brown to black (dark blue in life) spots; segmented dorsal-fin rays 26-28, usually 27; segmented anal-fin rays 15-17 (eastern Arabian Peninsula, Gulf of Aden, Socotra and southern Red Sea) .... *P. nigrovittatus*

22b. No scattered small dark spots on sides; segmented dorsal-fin rays 27-32, rarely 27; segmented anal-fin rays 16-20, rarely 16 23

23a. Head and body generally pale brown with darker brown edging on body scale margins (E coast of Africa to central coast of Oman) ..... *P. leucorhynchus*
23b. Head and body pale brown (yellowish brown to bright orange-yellow in life) with two purplish grey to grey (bright blue in life) stripes, one from snout tip above eye to dorsal edge of caudal peduncle, the other from middle of upper lip to dark spot on opercular flap (Arabian Sea, Gulf of Oman, Persian Gulf and Aldabra Id) ..... *P. aldabraensis*

24a. Segmented dorsal-fin rays 23-25, rarely 23 or 25 25
24b. Segmented dorsal-fin rays 25-31, usually 26-30 28

25a. Dorsal and anal fins with well-developed scale sheaths (Saint Brandon's Shoals, Indian Ocean) ..... *P. magnificus*
25b. Dorsal and anal fins without scale sheaths 26

26a. Anal-fin spines slender and weakly pungent to flexible, the second spine about as stout as the third (Great Barrier Reef) ..... *P. flammicauda*
26b. Anal-fin spines relatively stout and pungent, the second spine much stouter than the third 27

27a. Segmented anal-fin rays 12-13, usually 13; scales in lateral series 31-36; predorsal scales 18-25; scales of body behind pectoral-fin base each with a large pale yellow to pale brown central spot (eastern Indonesia, Papua New Guinea and Solomon Ids) ..... *P. alticaudex* sp. nov.
27b. Segmented anal-fin rays 13-14, usually 14; scales in lateral series 36-39; predorsal scales 14-18; no large pale spots on body scales (western Indonesia, Singapore and Gulf of Thailand) ..... *P. ransonneti*

28a. Segmented dorsal-fin rays 29-31; segmented anal-fin rays 15-16; teeth of outer ceratobranchial-1 gill rakers either weakly developed or well developed on raker tips only; dorsal and anal fins with well-developed scale sheaths (Sri Lanka) ..... *P. dilectus*
28b. Character combination not as above 29

29a. Body with 8-15 brown (black in life) straight-edged stripes (Komodo Id, Indonesia) ..... *P. cometes*
29b. If multiple dark stripes present on body, these consisting of closely spaced spots so that stripes wider at base of each scale 30

30a. Well-developed teeth on ceratobranchial-1 outer rakers arranged in 2 rows running most of raker lengths (Figure 24A) 31
30b. Well-developed teeth on ceratobranchial-1 outer rakers mainly confined to raker tips (Figure 24B) 32

31a. Dorsal and anal fins without scale sheaths; dorsal-fin origin to pelvic-fin origin 25.7-30.7 % SL (Red Sea) ..... *P. flavivertex*
31b. Dorsal and anal fins usually with weakly to well-developed scale sheaths present on at least posterior part of fins; dorsal-fin origin to pelvic-fin origin 29.7-35.7 % SL (eastern Indian and western Pacific Oceans) ..... *P. fuscus*

32a. Segmented anal-fin rays 13-15, rarely 13 or 15 33
32b. Segmented anal-fin rays 14-19, usually 15-18 34

33a. Second anal-fin spine much stouter than the third (Philippines, Indonesia, Timor Sea, Admiralty Ids, Great Barrier Reef and Solomon Ids) ..... *P. bitaeniatus*
33b. Second anal-fin spine about as stout as the third (northern Australia) ..... *P. wilsoni*

34a. Scales in lateral series 33-35; caudal fin pointed (rounded with middle rays produced); dorsal part of body with greyish brown (grey to black in life) reticulate pattern (Alor Id, Indonesia) ..... *P. pictus*
34b. Scales in lateral series 37-52; caudal fin rounded to truncate or emarginate; coloration not as above 35

35a. Scales in lateral series 41-52, usually 44-50; anterior lateral-line scales 34-44 36
35b. Scales in lateral series 38-45; anterior lateral-line scales 28-37 38

36a. Scales in lateral series 45-52, usually 47-50; dentary pores 4-6, usually 5-6 in specimens larger than about 50 mm SL; caudal fin of large specimens (greater than about 50 mm SL) with two prominent dark grey to black stripes, one near ventral edge of fin and one near dorsal edge of fin (Sri Lanka, Arabian Sea and Strait of Hormuz) ..... *P. caudalis*
36b. Scales in lateral series 41-50, usually 44-46; dentary pores 4-5, rarely 5; caudal fin without prominent dark stripes, although weak, dusky stripes sometimes present 37

37a. Predorsal scales 16-21; dark brown to dark grey-brown (dark bluish grey to black in life) spot present on anterior part of opercle just behind tip of preopercle in specimens larger than about 40 mm SL (Mozambique and Natal) ..... *P. natalensis*
37b. Predorsal scales 24; no dark spot on anterior part of opercle (Komodo Id, Indonesia) ..... *P. mooii* sp. nov.

38a. Segmented dorsal-fin rays 28-30, usually 29; 0-1 consecutive dorsal-fin pterygiophores inserting in 1:1 relationship with interneural spaces immediately behind neural spine 4; no dark spot present on anterior part of opercle (Madagascar, Comores Ids and E coast of Africa) ..... *P. tauberae*
38b. Segmented dorsal-fin rays 25-27; 3-5 consecutive dorsal-fin pterygiophores inserting in 1:1 relationship with interneural spaces immediately behind neural spine 4; dark grey to dark brown (dark blue edged posteriorly with black in life) spot usually present on anterior part of opercle in specimens larger than about 40 mm SL 39

39a. Segmented anal-fin rays 14-16, usually 15; total caudal-fin rays 30-33, usually 31 (Madagascar, Comores Ids and E coast of Africa) ..... *P. kristinae* sp. nov.
39b. Segmented anal-fin rays 16-17; total caudal-fin rays 32-34

(north-eastern Madagascar) .. *P. madagascariensis* sp. nov.

40a. Segmented dorsal-fin rays 21-23, rarely 21 or 23; segmented anal-fin rays 12-14, rarely 12 or 14; 2 epurals 41
40b. Combination of fin-ray counts not as above; 3 epurals 45

41a. Scales in lateral series 27-34, usually 29-32; anterior lateral-line scales 20-27, usually 23-25; predorsal scales 10-15, usually 11-13; males with dark grey to black horseshoe-shaped mark on caudal fin; females with dark grey to black spot covering posttemporal pores (Andaman Sea to Solomon Ids) ..... *P. tapeinosoma*
41b. Scales in lateral series 29-40, usually 30-38; anterior lateral-line scales 23-34, usually 24-32; predorsal scales 11-19, usually 13-16; males without dark horseshoe-shaped mark on caudal fin; females with grey to dusky grey spot covering posttemporal pores 42

42a. Males uniformly bright yellowish olive (brown, paler ventrally, in preservative) (Christmas Id, Indian Ocean) ..... *P. viridis*
42b. Males dark grey to black (dark brown to black in preservative), with at least lower part of head yellowish brown to bright yellow (pale brown to brown in preservative) 43

43a. Scales in lateral series 33-40, usually 35-38; anterior lateral-line scales 28-34, usually 30-32; scales below anterior lateral line 11-14, usually 12-13 (Maldive and Laccadive Ids to western Indonesia) ..... *P. coccinicauda*
43b. Scales in lateral series 29-37, usually 31-35; anterior lateral-line scales 23-31, usually 24-29; scales below anterior lateral line 9-13, usually 10-12 44

44a Scales in lateral series 30-37, usually 31-36; males with lower part of head and breast and scales of ascending portion of anterior lateral line and of scale row immediately below horizontal portion of anterior lateral line abruptly yellowish brown to bright yellow (pale brown to brown in preservative), the remainder of head and body dark grey to black (dark brown to black in preservative) (eastern Indonesia and Peninsular Malaysia to the Gilbert Ids) ..... *P. cyanotaenia*
44b. Scales in lateral series 29-35, usually 30-33; males dark grey to black (dark brown to black in preservative), with lower part of head and body in front of anal fin yellowish brown (pale brown to brown in preservative) (Fiji and Tonga) ..... *P. melanurus* sp. nov.

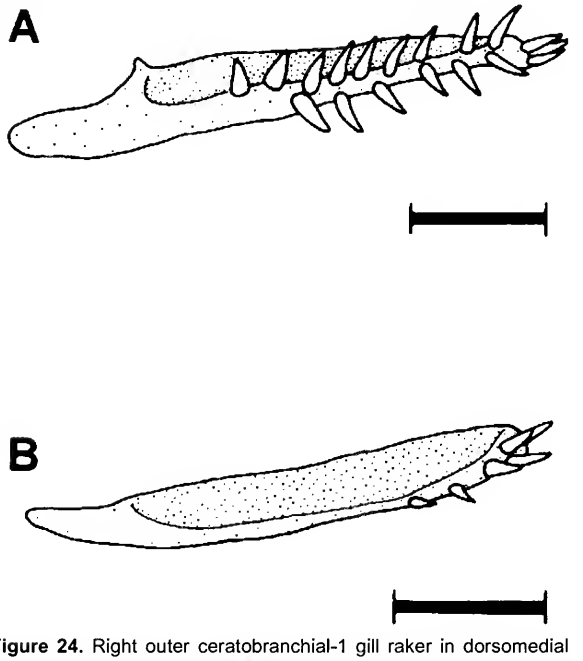

Figure 24. Right outer ceratobranchial-1 gill raker in dorsomedial view of: A) *Pseudochromis fuscus*, AMS I.18469-178, 48.0 mm SL; B) *P. bitaeniatus*, NTM S.11371-084, 40.2 mm SL. Scale = 0.2 mm.

45a. Segmented dorsal-fin rays 25-27 (usually 26) with only the last 2-9 rays branched 46
45b. Character combination not as above 47

46a. Body more-or-less uniformly pale; horizontal scales above anal-fin origin 11-13 + 1 + 2-3 = 14-16 (eastern Indonesia) ... *P. elongatus*
46b. Body pale with 5-9 dark stripes; horizontal scales above anal-fin origin 9-10 + 1 + 1-2 = 11-13 (Ryukyu Ids, Taiwan and Batan Ids, Philippines) ..... *P. striatus*

47a. Fin spines weakly pungent to flexible; second anal-fin spine about as stout as the third; lower lip varying from incomplete with weak symphyseal interruption to complete 48
47b. Fin spines stout; second anal-fin spine slightly to much stouter than the third; lower lip incomplete 50

48a. Anterior lateral-line scales 25-26; anterior lateral line terminating beneath segmented dorsal-fin ray 15-16; 4 consecutive dorsal-fin pterygiophores inserting in a 1:1 association with interneural spaces immediately behind neural spine 4 (New Caledonia) ..... *P. kolythrus*
48b. Anterior lateral-line scales 26-34, usually 28-32; anterior lateral line terminating beneath segmented dorsal-fin ray 17-25, usually 19-24; 1-4, usually 1-3 consecutive dorsal-fin pterygiophores inserting in a 1:1 association with interneural spaces immediately behind neural spine 4 49

49a. Dorsoanterior part of caudal peduncle usually with indistinct to distinct grey to black spot; 1-2 (modally 1) consecutive dorsal-fin pterygiophores inserting in a 1:1 association with interneural spaces immediately behind neural spine 4; pectoral-fin rays 18-20 (south-west Pacific) ..... *P. jamesi*
49b.Coloration not as above; 2-4 (modally 3) consecutive dorsal-fin pterygiophores inserting in a 1:1 association with interneural spaces immediately behind neural spine 4; pectoral-fin rays 16-19, usually 17-18 (Batan Ids, Taiwan and Ryukyu Ids) ..... *P. luteus*

50a. Third anal-fin spine length 10.0-13.8 % SL; dorsal-fin origin to pelvic-fin origin 29.7-35.1 % SL; scales in lateral series 30-34, usually 31-33 (Philippines and Sabah, Malaysia) ..... *P. fowleri*
50b. Third anal-fin spine length 5.7-9.1 % SL; dorsal-fin origin to pelvic-fin origin 23.8-32.4 % SL; scales in lateral series 33-

42, rarely 33 51

51a. Segmented anal-fin rays 16; scales below anterior lateral line 10-12, usually 10-11 (Komodo Id, Indonesia) .... *P. flavopunctatus*
51b. Segmented anal-fin rays 11-15; scales below anterior lateral line 11-15, usually 12-14 52

52a. Caudal fin rounded in small (less than 35 mm SL) specimens, becoming pointed (rounded with middle rays produced) in larger specimens; in preservative, predorsal contour and nape pale pinkish brown; dorsal contour of body and caudal peduncle with dark, grey-brown reticulations surrounding pale spots (north-western Australia) .... *P. reticulatus*
52b. Caudal fin rounded, truncate or emarginate; coloration not as above 53

53a. Segmented anal-fin rays 11-14, usually 13 (Western Australia, West and central Pacific) ..... *P. marshallensis*
53b. Segmented anal-fin rays 13-15, usually 14-15 54

54a. Segmented dorsal-fin rays 22-25, usually 24 (eastern Andaman Sea, Mentawai Ids, Bali and Timor Sea) .... *P. andamanensis*
54b. Segmented dorsal-fin rays 25-27 55

55a. No dark spot at axil of pectoral fin; segmented dorsal-fin rays 25 (south-eastern Indonesia) ..... *P. litus*
55b. Dark spot present at axil of pectoral fin; segmented dorsal-fin rays 25-27, usually 26-27 56

56a. Head and anterior part of body yellowish brown (bright golden orange in life), becoming brown posteriorly (bluish grey in life), with caudal fin brown basally (bluish grey in life); segmented dorsal-fin rays 27; anal-fin origin to middle dorsal-fin ray 27.2-28.6 % SL; dorsal-fin termination to anal-fin termination 16.4-17.0 % SL (Komodo Id, Indonesia) .... *P. aurulentus*
56b. Head and anterior part of body brown (bluish grey in life), paler ventrally, with caudal fin, caudal peduncle and posterior part of body behind middle of anal fin abruptly pale brown (bright yellow in life); segmented dorsal-fin rays 25-27, usually 26; anal-fin origin to middle dorsal-fin ray 22.5-27.1 % SL; dorsal-fin termination to anal-fin termination 14.3-16.1 % SL (Banda and Flores Seas, Indonesia, and Belau) ..... *P. pylei*

Pseudochromis aldabraensis Bauchot-Boutin

Arabian Blue-lined Dottyback
Figures 25-28; Plate 4F; Table 3

Pseudochromis aldabraensis Bauchot-Boutin in Arnoult et al., 1958: 80, fig. 6 (type locality: Aldabra Id); Hoover, 1993: 8 (colour fig.; aquarium notes); Gill, 1993: 41 (colour fig.; habitat and distribution; comparison with *P. dutoiti*); Gill & Mee, 1993: 54, fig. 1 (habitat and distribution; colour fig.); Fosså & Nilsen, 1993: 130 (colour fig.; habitat and distribution; aquarium notes); Debelius, 1993: 110 (colour fig.; distribution); Gill & Randall, 1994: 16 (key); Randall, 1995: 141, fig. 331 (description; colour fig.; distribution); Debelius, 1996: 110, 111 (colour figs); Carpenter et al., 1997: 147 (description; habitat notes; fig.).

Pseudochromis dutoiti [*non* Smith, 1955]; Klausewitz, 1961: 429, fig. 2 (Pakistan and Ceylon); Lubbock, 1975: 142, pl. 2, fig. b (description and distribution in part; Aldabra Id, Persian Gulf, Gulf of Oman, Pakistan and Ceylon records only); Lubbock, 1977: 4 (description and distribution in part; same localities as Lubbock, 1975); Randall et al., 1978: 215, colour pl. 77 (Persian Gulf; colour fig.); Relyea, 1981: 66, pl. 3, fig. d (distribution in part, Kuwait, Saudi Arabia, Bahrain and Sri Lanka records only; colour fig.); Debelius, 1984b: 426 (colour fig.); Godkin & Winterbottom, 1985: 635, fig. 1 (Bahrain, Persian Gulf; osteological and myological details); Al-Baharna, 1986: 202 (description in part; colour fig.); Debelius, 1986: 21 (colour fig.); Bauchot & Desoutter, 1986: 86 (list); Smith et al., 1987: 135 (list); Giovanetti, 1989: 77 (colour fig.); Michael, 1990b: 16 (colour figs); Debelius, 1998: 71 (colour fig.; habitat and distribution).

Pseudochromis aldabrensis; Baensch & Debelius, 1992: 968 (distribution; colour fig.; not synonymy or sexual dimorphism; specific epithet misspelt).

Pseudochromis paradutoiti; Mooi, 1996: 107 (*nomen nudum*; list).

DIAGNOSIS: *Pseudochromis aldabraensis* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 27-31 (rarely 27); segmented anal-fin rays 16-19 (usually 18-19); scales in lateral series 36-45; anterior lateral-line scales 24-33; no prominent dark grey to black spots surrounding cephalic sensory pores; and a bright blue (pale purplish grey to grey in preservative) stripe extending from middle of upper lip beneath eye to meet a dark grey to black spot on the opercular flap.

DESCRIPTION (based on 89 specimens, 21.8-67.4 mm SL): dorsal-fin rays IlI-IV,27-31, last 4-28 segmented rays branched; anal-fin rays III,16-19, last 8-19 segmented rays branched; pectoral-fin rays 16-19; upper procurrent caudal-fin rays 6-8; lower procurrent caudal-fin rays 6-8; total caudal-fin rays 29-33; scales in lateral series 36-45; anterior lateral-line scales 24-33; anterior lateral line terminating beneath segmented dorsal-fin ray 15-22; posterior lateral-line scales 4-10 + 0-2; scales between lateral lines 3-5; horizontal scale rows above anal-fin origin 13-17 + 1 + 2-4 = 16-21; circumpeduncular scales 19-21; predorsal scales 17-27; scales behind eye 3-5; scales to preopercular angle 5-7; gill rakers 3-6 + 11-13 = 15-18; pseudobranch filaments 7-11; circumorbital pores 11-33; preopercular pores 8-16; dentary pores 4-6; posterior interorbital pores 0-3.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from PIO pores to anterior AIO pores; opercle with 4-7 usually relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed mainly on raker tips, although sometimes with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S*/S + 3/1 + 1/1 + 1*/1/1/1 + 1* or S/S/S + 3/1 + 1/1/1/1 + 1*/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1 + 1*/1; anal-

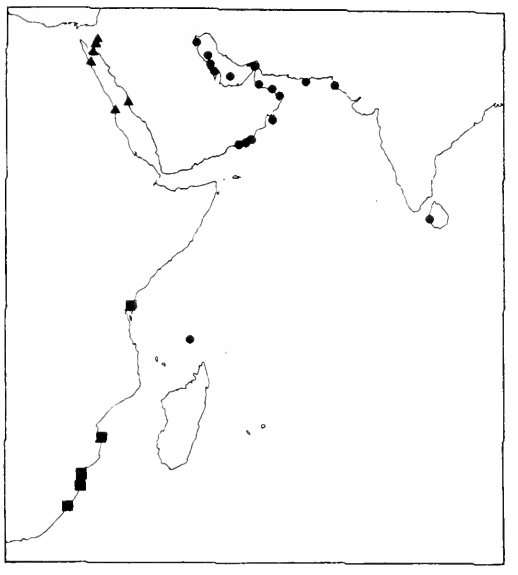

Figure 25. Distributional records for *Pseudochromis aldabraensis* (closed circles), *P. dutoiti* (squares) and *P. springeri* (triangles). The Sri Lankan record for *P. aldabraensis* is not intended to indicate a specific locality.

fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray usually longest, although third ray sometimes subequal or slightly longer; caudal fin rounded, usually weakly rounded to truncate posteriorly, often with upper and/or lower lobes produced; vertebrae 10 + 16; epineurals 16-18; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 5-7 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-3 rows of small conical teeth, forming chevron; palatine with 3-5 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 16 specimens, 21.8-67.4 mm SL): head length 20.4-28.4; orbit diameter 5.8-10.6; snout length 5.0-5.6; fleshy interorbital width 4.2-6.4; bony interorbital width 2.5-4.6; body width 8.1-11.9; snout tip to posterior tip of retroarticular bone 11.6-14.2; predorsal length 27.2-35.3; prepelvic length 27.0-32.6; posterior tip of retroarticular bone to pelvic-fin origin 16.2-19.9; dorsal-fin origin to pelvic-fin origin 20.9-27.5; dorsal-fin origin to middle dorsal-fin ray 33.8-40.0; dorsal-fin origin to anal-fin origin 36.8-41.8; pelvic-fin origin to anal-fin origin 27.0-33.1; middle dorsal-fin ray to dorsal-fin termination 27.1-31.6; middle dorsal-fin ray to anal-fin origin 19.6-24.6; anal-fin origin to dorsal-fin termination 35.3-41.9; anal-fin base length 29.4-36.4; dorsal-fin termination to anal-fin termination 11.7-15.1; dorsal-fin termination to caudal peduncle dorsal edge 7.1-9.6; dorsal-fin termination to caudal peduncle ventral edge 14.7-17.9; anal-fin termination to caudal peduncle dorsal edge 16.0-18.8; anal-fin termination to caudal peduncle ventral edge 8.3-10.1; first dorsal-fin spine 1.6-2.8; second dorsal-fin spine 3.0-5.5; third dorsal-fin spine 4.5-7.3; first segmented dorsal-fin ray 9.1-12.3; fourth last segmented dorsal-fin ray 13.6-17.5; first anal-fin spine 1.4-2.8; second anal-fin spine 3.6-5.0; third anal-fin spine 4.1-6.0; first segmented anal-fin ray 7.3-9.8; fourth last segmented anal-fin ray 11.6-15.0; third pectoral-fin ray 11.4-14.7; pelvic-fin spine 6.0-9.2; second segmented pelvic-fin ray 13.6-16.8; caudal-fin length 20.2-25.2.

Live coloration (based on photographs of specimens from the Persian Gulf and Oman, field observations in Abu Dhabi, Persian Gulf, and on captive specimens; Plate 4F): head and body yellowish brown to bright orange-yellow; narrow bright blue stripe extending from snout tip above eye and along anterior lateral line to dorsal edge of caudal peduncle; second bright blue stripe extending beneath eye from middle of upper lip to dark grey spot on opercular flap, stripe contiguous anteriorly to bright blue patch on middle of lower lip; dark grey to black spot on opercular flap, this edged posteriorly with gold; lower part of nape and area behind eye between stripes dark grey; dorsal contour of head and area in front of eye between stripes reddish brown to orange; upper part of head and dorsal angle of preopercle with indistinct grey spots; ventral contour of head, lower opercular region and sometimes preanal contour marked with irregular bright blue patches; iris reddish brown to bright red with bright blue suboval ring around pupil; anterior lateral-line scales each with dark grey to black basal spot; dorsal fin dark grey to black with series of ovoid bright blue spots on segmented part of fin; distal third of fin with irregular bright blue stripe, followed distally by narrow black stripe, thin reddish grey stripe and indistinct bright blue marginal stripe; dark grey to black portions of fin often irregularly marked with bright blue spot and streaks; anal fin bright orange with distal third of fin greyish orange to pale blue, distal margin bright blue; basal portion and distal third of fin usually with intermittent mauve to bright blue spots; caudal fin bright orange-yellow to bright orange-red; bright blue stripe on caudal peduncle continued submarginally on upper lobe of fin, this followed distally by narrow black stripe and thin bright blue distal margin; lower lobe of fin sometimes edged in bright blue; pectoral fins orangish hyaline; pelvic fins orange basally becoming bluish hyaline distally.

Preserved coloration: pattern similar to live coloration, head and body becoming pale brown; bright blue markings becoming pale purplish grey to grey; dark grey to black blotch on opercular flap remains; lower part of nape and area on head between bright blue stripes becoming brown with dark grey to black curved stripe around posterior orbital rim between stripes; lower supraotic, uppermost infraorbital, lower posterior otic, uppermost preopercular, intertemporal and posttemporal pores surrounded by dusky grey pigmentation; dark grey to black spots on anterior lateral-line scales becoming grey to dark grey; dorsal fin becoming brown with black spots basally on each interradial membrane and in several rows distally, with distal margin of fin pale grey; anal fin becoming pale grey to pale brown, distally with submarginal row of brown to black spots and streaks; caudal fin becoming brown basally, grading to whitish hyaline posteriorly, narrowly dark grey to black dorsally, with broad dark grey to black oblique stripe

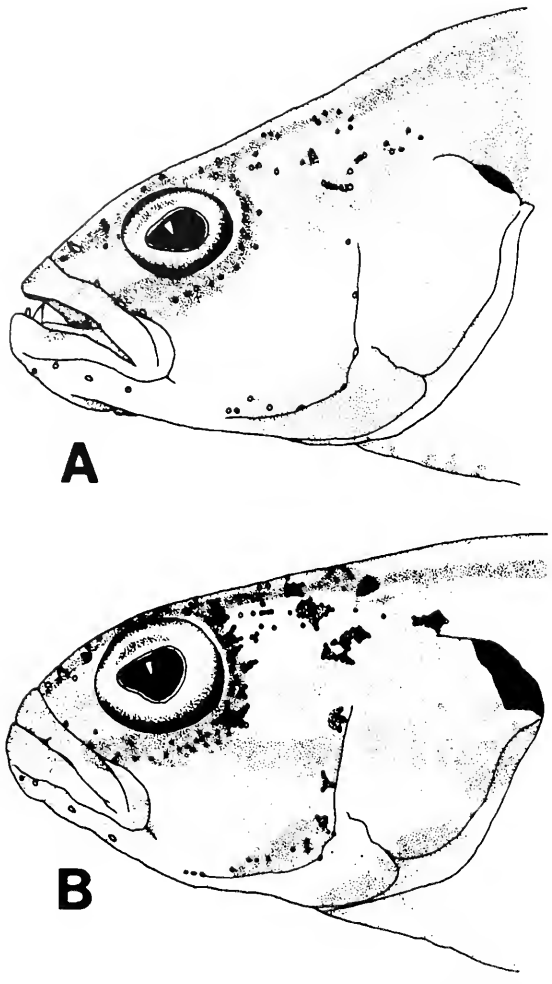

Figure 26. Heads of preserved specimens of: A) *Pseudochromis aldabraensis*, BPBM 21254, 67.1 mm SL; B) *P. dutoiti*, RUSI 1847, 68.5 mm SL.

submarginally on upper lobe, and sometimes with narrow pale grey to dark grey oblique stripe on lower lobe; pectoral fins hyaline; pelvic fins pale brown.

HABITAT AND DISTRIBUTION: *Pseudochromis aldabraensis* is known only from Aldabra Id (however, see *Remarks* below) and from Kuwait (Relyea, 1981; N. Downing, pers. comm.) east to Sri Lanka, and south to southern Oman (Figure 25). J. Kemp (pers. comm.), who reeorded the species as common in southern Oman (at the Al Hallinaya Ids, Salalah and Sadh), did not see it in over 70 hours of diving in the eastern Gulf of Aden. *Pseudochromis aldabraensis* was recorded from Sri Lanka (as *P. dutoiti*) by Klausewitz (1961) on the basis of specimens obtained through the Tropiearium Frankfurt (aquarium fish importers). The validity of this locality record has been questioned by Lubbock (1976), but R.D. Sankey (pers. comm.) noted that the species does occur in Sri Lanka. Apparently, specimens from Sri Lanka are drably coloured (ground coloration brown rather than orange) and the species is, therefore, less conspicuous and rarely collected by aquarium fish collectors. *Pseudochromis aldabraensis* has been observed (Lubbock, 1975: 143; Relyea, 1981: 66; Gill & Mee, 1993: 54; pers. obs.) and collected from tidal pools and rock and coral reefs around crevices, boulders and coralline algae at depths ranging to 40 m; it is frequently found in association with *Diadema* sea urchins.

COMPARISONS: *Pseudochromis aldabraensis* is very similar in morphology to *P. dutoiti* from east Africa, and has in the past been confused with that species. However, as noted by Lubbock (1977), *P. aldabraensis* (his northern form of *P. dutoiti*) differs from *P. dutoiti* in the following live coloration details: preorbital and dorsal contour of head reddish brown to orange (versus dark grey); blue line from below eye contacts dark spot on opercular spot (versus meets opercular margin below dark spot on opercular flap); lower part of head bright orange (versus dark grey); indistinct dark spots on dorsal part of head and at dorsal angle of preopercle (versus distinct black spots on upper part of head, above dorsal angle of gill opening and along posterior margin of preopercle); and lower lobe of caudal fin distally with or without a blue marginal stripe (versus with a narrow blue stripe bordered proximally by respective broad black and broad blue stripes). The head stripe, head spot and lower eaudal lobe differences remain evident following preservation (Figure 26). In addition to coloration, *P. dutoiti* differs from *P. aldabraensis* in having a denser distribution of cephalic sensory pores. Since the number of these pores tends to increase with increasing size more notably in *P. dutoiti* than in *P. aldabraensis*, the differences are more obvious when large specimens are compared (Figures 27-28). The two species also differ in several meristic characters. In particular, *P.*

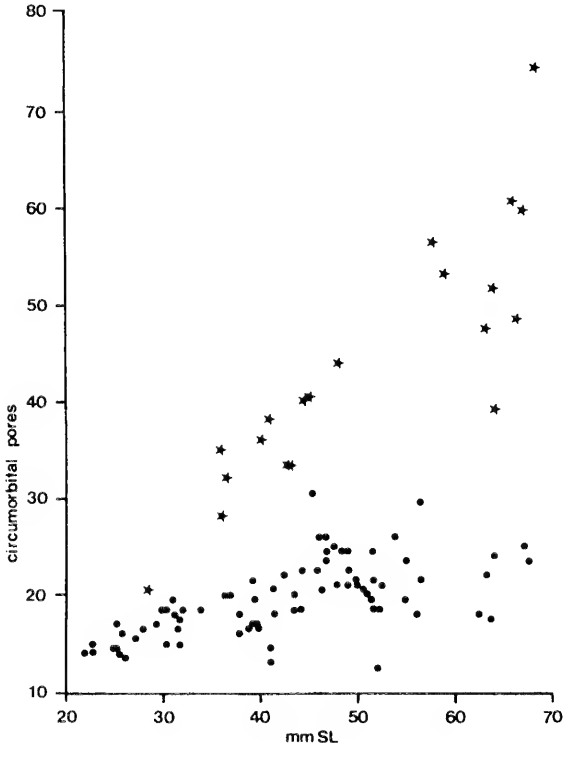

Figure 27. Plot of number of circumorbital pores (average of left and right sides) against standard length for *Pseudochromis aldabraensis* (closed circles) and *P. dutoiti* (stars).

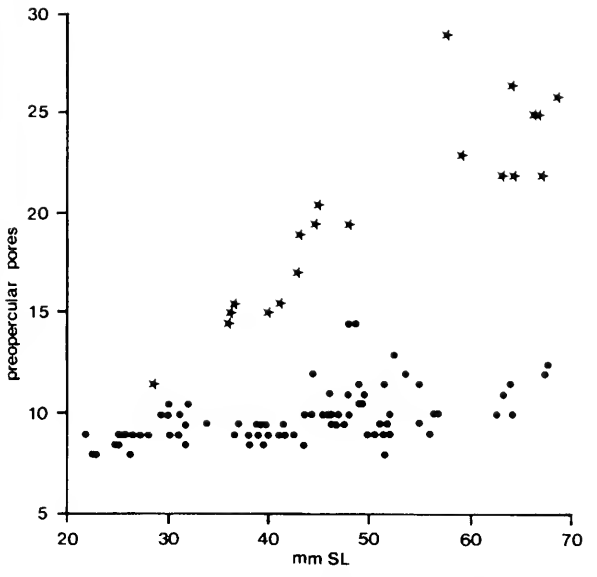

Figure 28. Plot of number of preopercular pores (average of left and right sides) against standard length for *Pseudochromis aldabraensis* (closed circles) and *P. dutoiti* (stars).

aldabraenis tends to have fewer segmented dorsal-fin rays [27-31, modally 29-30 depending on locality (see *Remarks*; Appendix 1), versus 29-32, modally 31], and fewer scales in lateral series (36-45, usually 39-43, versus 41-47, usually 44-46).

REMARKS: *Pseudochromis aldabraensis* is a moderately large species; the largest specimen examined measured 67.4 mm SL. Live colour illustrations of it are provided in Lubbock (1975), Randall et al. (1978), Al-Baharna (1986), Debelius (1986, 1993, 1996, 1998), Giovanetti (1989), Gill & Mee (1993), Fosså & Nilsen (1993) and Randall (1995).

Pseudochromis aldabraensis exhibits geographic variation in several meristic characters (Table 3): most notably, specimens from Pakistan and Sri Lanka tend to have more segmented dorsal-fin rays, more pectoral-fin rays and fewer scales between lateral lines than those from other areas. Lubbock (1975: 143) noted that the ground coloration of specimens from Bahrain was "brownish" rather than "yellow-orange;" R. Sankey (pers. comm.; see *Habitat and Distribution* above) noted that Sri Lankan *P. aldabraensis* are also brown rather than orange. It is possible that further studies will justify subdivision of *P. aldabraensis* as defined here into two or more species.

There is reason to question the type locality for *P. aldabraensis*, as subsequent collecting in Aldabra has failed to yield further specimens of the species (or of any other pseudochromine species). All other specimens of *P. aldabraenis* are from the Persian Gulf, Gulf of Oman, Arabian Sea and Sri Lanka. Possibly, then, the holotype represents a waif from these areas, or its collection data are erroneous.

ETYMOLOGY: The specific epithet is for the type locality.

MATERIAL EXAMINED: PERSIAN (=ARABIAN) GULF: Saudi Arabia, Jana Id, BPBM 30442, 1(0), 42.0 mm SL, BPBM 30471, 6(0), 10.0-50.0 mm SL; Saudi Arabia, Tarut Bay, Ras Tannurah, USNM 147901, 1(1), 31.7 mm SL; Bahrain, reef at 26°08'20"N 50°43'20"E, BPBM 30518, 3(0), 35.0-56.0 mm SL; Bahrain, 7 km E of Sitrah Id, BPBM 21254, 1(1), 67.1 mm SL, BPBM 31955, 4(4), 41.5-51.4 mm SL; Bahrain, 8 km E of Sitrah Id, WAM P.25987-010, 3(3), 49.6-64.0 mm SL; Das Id, BMNH 1973.1.22.6-17, 12(0), 15.0-58.5 mm SL; Oman, Al Khasab, BMNH 1973.1.22.18-25, 8(8), 36.0-56.6 mm SL. GULF OF OMAN: United Arab Emirates, Khor Fakkan, WAM P.26462-008, 1(1), 41.2 mm SL; Oman, Matrah, Doha, BPBM 21477, 3(3), 42.4-49.2 mm SL; Oman, Sur, NW of Kalhat, AMS I.26945-001, 2(2), 52.6-63.2 mm SL, AMS I.26945-002, 2(2), 34.7-55.5 mm SL (cleared and stained), MNHN 1987-1321, 1(1), 51.6 mm SL, ROM 40012, 19(19), 30.9-67.4 mm SL, RUSI uncat, 1(1), 50.5 mm SL, SMF 21621, 1(1), 43.4 mm SL. PAKISTAN: Astola Id, USNM 212272, 35(35), 21.8-56.7 mm SL (3, 33.0-53.0 mm SL, cleared and stained), NSMT-P 44641, 1(1), 46.9 mm SL; Karachi, Cape Monze, BPBM 16410, 1(1), 39.9 mm SL. SRI LANKA (CEYLON): USNM 19597, 4(4), 40.0-48.9 mm SL. ALDABRA ID: MNHN 1954-145, 1(1), 39.7 mm SL (holotype).

Table 3. Frequency distributions for selected meristic characters of *Pseudochromis aldabraensis* from different localities.

	Segmented dorsal rays						Pectoral rays					Sc. betw. lat. lines			
	27	28	29	30	31	$\bar{X}$	16	17	18	19	$\bar{X}$	3	4	5	$\bar{X}$
Aldabra?	-	-	1	-	-		-	2	-	-	17.0	-	-	2	5.0
Persian Gulf															
Ras Tannurah	-	1	-	-	-		-	1	1	-	17.5	-	-	2	5.0
Bahrain	-	1	6	1	-	29.0	-	15	1	-	17.1	-	5	11	4.7
Al Khasab	-	1	5	2	-	29.1	-	12	4	-	17.3	-	3	13	4.8
Gulf of Oman															
Khorr Fakkan	-	-	1	-	-		-	2	-	-	17.0	-	1	1	4.5
Matrah	-	-	2	1	-	29.3	-	4	2	-	17.3	-	5	1	4.2
Sur area	1	6	15	4	-	28.9	3	46	8	-	17.1	-	16	22	4.6
Pakistan															
Astola I.	-	3	20	10	3	29.4	-	7	57	8	18.0	3	57	4	4.0
Cape Monze	-	-	-	-	1		-	-	2	-	18.0	-	2	-	4.0
Sri Lanka	-	-	1	3	-	29.8	-	2	6	-	17.8	-	7	-	4.0

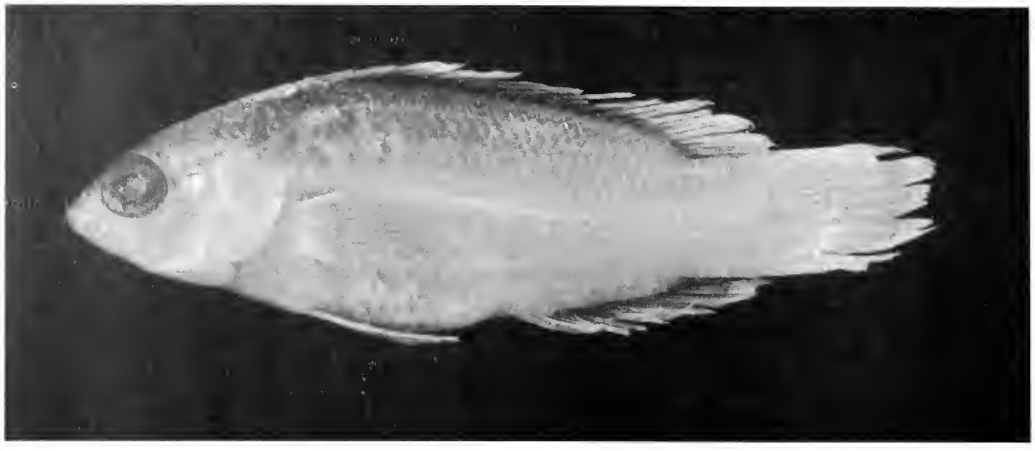

Figure 29. *Pseudochromis alticaudex*, BMNH 1974.5.25.965, 32.0 mm SL, paratype, Krankett Island, Madang, Papua New Guinea. (Photo by P. Crabb)

***Pseudochromis alticaudex* sp. nov.**
Spotbreast Dottyback
Figures 29-30

Pseudochromis marshallensis [*non* Schultz, 1953]; Kailola, 1987: 244 (list, in part, Kranket Id, Papua New Guinea).

Pseudochromis aurea marshallensis [*non* Schultz, 1953]; Matsuura & Hayashi, 1986: 80, 83 (list, Makomba Id, Solomon Ids).

Pseudochromis sp. 1; Gill & Randall, 1998: 21, 23 (comparisons).

Pseudochromis sp. 4; Gill, 1999b: 2564 (key).

HOLOTYPE: AMS I.17089-030, 45.8 mm SL, Papua New Guinea, Madang Harbour, bay in Kranket Id, coral reef with sand patches, 1.5-7.5 m, B.B. Collette, B. Goldman and G. Palmer, 30 May 1970.

PARATYPES: RMNH 20723, 28.5 mm SL, Indonesia, Pulau Pulau Boö, 5 October 1930; CAS 65799, 32.0 mm SL, Papua New Guinea, Nagada Harbour, 1.5 km from tip of point on S side of channel, sand, silt and coral, 0-1.5 m, S.G. and S.Y. Poss, 23 April 1987; USNM 296198, 12: 21.5-34.4 mm SL, Papua New Guinea, Nagada Harbour, SSW side of small island in middle of upper third of channel, coral and silt, 1.0-4.0 m, S.G. Poss, S.Y. Poss et al., 1 May 1987; WAM P.29595-016, 33.3 mm SL, Papua New Guinea, Madang, 0.1-3.0 m, G.R. Allen and L. Parenti, 29 September 1987; AMS I.17089-047, 10: 23.0-36.5 mm SL (2: 23.0-31.1 mm SL cleared and stained), same data as holotype; BMNH 1974.5.25.965, 32.0 mm SL, Papua New Guinea, Madang Harbour, bay in Kranket Id, coral interspersed with sand patches, 1.5-7.5 m, chemfish, B.B. Collette, B. Goldman and G. Palmer, 30 May 1970; BMNH 1974.5.25.960-964, 5: 23.4-39.5 mm SL, Papua New Guinea, inlet on harbour side of Kranket Id, coral reef on sand and mud, 0-3 m, chemfish, B.B. Collette, B. Goldman and G. Palmer, 23 May 1970; USNM 290341, 3: 31.9-37.9 mm SL, Papua New Guinea, lagoon on NW side of Kranket Id, 0-1.0 m, V.G. Springer et al., 7 November 1978; WAM P.24915-002, 2: 29.4-38.3 mm SL, Papua New Guinea, D'Entrecasteaux Group, Goodenough Id, G.R. Allen, 28 May 1972; USNM 290609, 29.7 mm SL, Solomon Ids, New Georgia Id, Blackett Straits, W.M. Chapman, June 1944; USNM 290971, 2: 31.4-33.5 mm SL, Solomon Ids, Florida Id, Upper Purvis Bay, coral, W.M. Chapman et al., 4 May 1944; NSMT-P 23309, 22.5 mm SL, Solomon Ids, Florida Ids, Makambo Id, 3 m, K. Matsuura, 26 August 1984.

DIAGNOSIS: *Pseudochromis alticaudex* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 24-25 (usually 24) with all or all but first rays branched in specimens larger than 25 mm SL; segmented anal-fin rays 12-13 (usually 13); anterior lateral-line scales 18-25; circumpeduncular scales 16-20 (usually 20); anal-fin spines relatively stout and pungent, the second much stouter than the third; and a preserved coloration consisting of pale central spots on scales of flanks behind pectoral-fin base, and dark central spots on breast scales.

DESCRIPTION (based on 41 specimens, 21.5-45.8 mm SL; minimum and maximum value ranges given first for all type specimens, followed, where different, by values for holotype enclosed in parentheses): dorsal-fin rays III,24-25 (III,24), last 6-25 (24) segmented rays branched (all, or all but first segmented rays branched in specimens larger than 25 mm SL); anal-fin rays III,12-13 (III,13), last 6-13 (13) segmented rays branched (all, or all but first 1-2 segmented rays branched in specimens larger than 22 mm SL); pectoral-fin rays 16-19 (17/17); upper procurrent caudal-fin rays 6-8 (7); lower procurrent caudal-fin rays 6-7 (7); total caudal-fin rays 29-32 (31); scales in lateral series 31-36 (34/34); anterior lateral-line scales 18-25 (22/22); anterior lateral line terminating beneath segmented dorsal-fin ray 10-18 (14/14); posterior lateral-line scales 6-11 + 0-2 (9 + 1/9 + ?); scales between lateral lines 3-5 (4/4); horizontal scale rows above anal-fin origin 11-14 + 1 + 2-4 = 15-18 (13 + 1 + 4/13 + 1 + 3); circumpeduncular scales 16-20 (20); predorsal scales 18-25 (21); scales behind eye 2-4 (3); scales to preopercular angle 4-5 (4); gill rakers 3-6 + 9-12 = 13-18 (4 + 10); pseudobranch filaments 6-9 (9); circumorbital pores 14-25 (24/25); preopercular pores 7-11 (10/11); dentary pores 3-5 (4/4); posterior interorbital pores 0-1 (0).

Lower lip incomplete; dorsal and anal fins without distinct scale sheaths, although intermittent scales overlapping fin bases sometimes present; predorsal scales extending anteriorly to point ranging from vicinity of anterior AIO pores to midway between posterior nasal pores and posterior nostrils; opercle

with 3-5 (4) usually well-developed serrations; well-developed teeth of outer ceratobranchial-1 gill rakers confined to raker tips; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1/1 + 1*/1/1 (S/S/S + 3/1 + 1/1/1/1/1/1/1 + 1/1); dorsal-fin spines relatively stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1*/1/1 + 1 (3/1 + 1/1/1/1 + 1); anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout and pungent; second segmented pelvic-fin ray usually longest, although sometimes subequal to third; caudal fin slightly rounded to truncate or emarginate; vertebrae 10 + 16; epineurals 13-14 (14); epurals 3.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 5-7 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 2-3 rows of small conical teeth, forming chevron; palatine with 3-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 45.8 mm SL holotype and 16 paratypes, 21.5-38.3 mm SL): head length 24.5-29.8 (24.5); orbit diameter 8.3-13.0 (8.3); snout length 6.0-7.1 (6.6); fleshy interorbital width 5.5-6.7 (5.7); bony interorbital width 3.2-4.5 (4.1); body width 12.3-14.0 (12.7); snout tip to posterior tip of retroarticular bone 13.3-16.3 (13.3); predorsal length 35.5-40.9 (35.8); prepelvic length 33.6-36.3 (33.6); posterior tip of retroarticular bone to pelvic-fin origin 20.1-22.4 (21.8); dorsal-fin origin to pelvic-fin origin 30.1-32.6 (30.1); dorsal-fin origin to middle dorsal-fin ray 31.1-35.5 (33.4); dorsal-fin origin to anal-fin origin 42.9-46.0 (43.2); pelvic-fin origin to anal-fin origin 28.3-34.7 (30.8); middle dorsal-fin ray to dorsal-fin termination 21.4-25.0 (23.6); middle dorsal-fin ray to anal-fin origin 28.2-31.9 (28.2); anal-fin origin to dorsal-fin termination 32.2-35.6 (34.1); anal-fin base length 22.8-26.1 (25.5); dorsal-fin termination to anal-fin termination 16.6-18.4 (16.6); dorsal-fin termination to caudal peduncle dorsal edge 10.9-12.3 (11.8); dorsal-fin termination to caudal peduncle ventral edge 19.9-21.1 (20.3); anal-fin termination to caudal peduncle dorsal edge 21.4-22.8 (22.3); anal-fin termination to caudal peduncle ventral edge 12.2-14.1 (13.8); first dorsal-fin spine 1.8-2.9 (2.4); second dorsal-fin spine 6.0-8.3 (7.0); third dorsal-fin spine 9.4-11.6 (9.4); first segmented dorsal-fin ray 12.8-16.6 (15.3); fourth last segmented dorsal-fin ray 14.9-17.6 (17.0); first anal-fin spine 3.0-4.6 (4.1); second anal-fin spine 9.7-13.2 (11.6); third anal-fin spine 8.3-10.2 (9.8); first segmented anal-fin ray 11.9-15.6 (13.3); fourth last segmented anal-fin ray 14.9-17.3 (16.6); third pectoral-fin ray 15.3-18.5 (15.3); pelvic-fin spine 11.1-13.5 (11.4); second segmented pelvic-fin ray 23.2-30.4 (28.6); caudal-fin length 22.4-26.0 (23.4).

Live coloration: not known.

Preserved coloration: head and body brown to dark purplish brown, paler on breast and lower part of head; midposterior portion of orbital rim dark greyish brown; scales of body behind pectoral fin base each with large pale yellow to pale brown central spot; scales of breast each with brown to dark brown central spot; dorsal and anal fins dark purplish

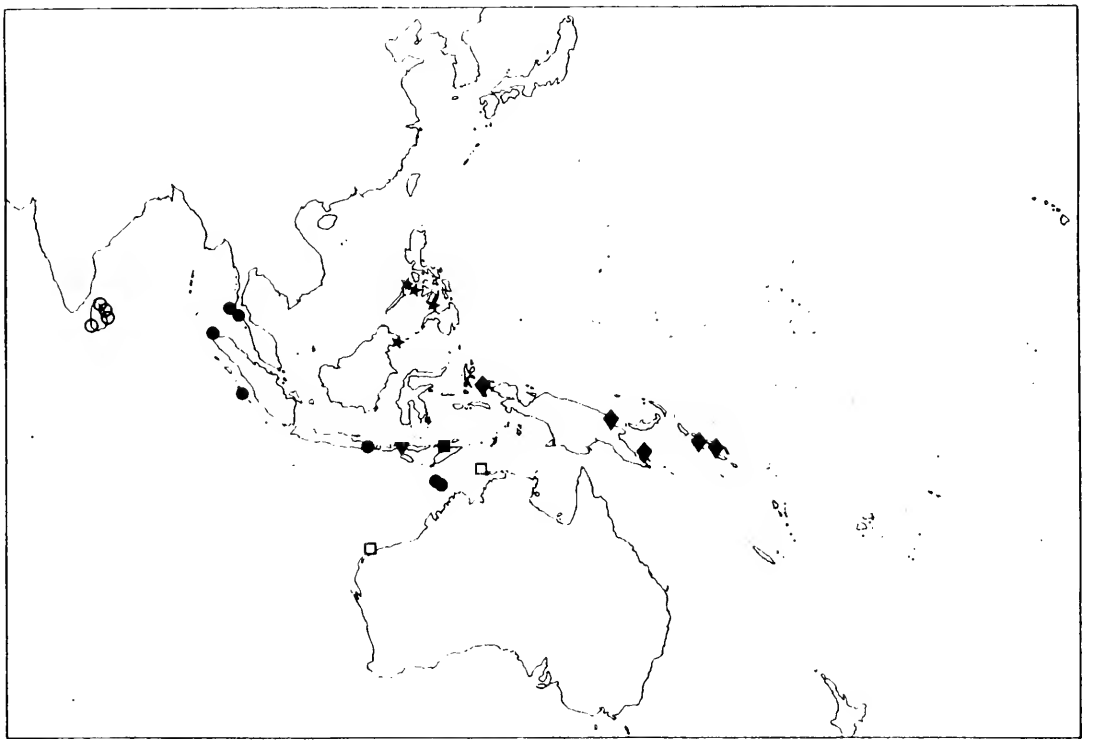

Figure 30. Distributional records for *Pseudochromis alticaudex* (diamonds), *P. andamanensis* (closed circles), *P. aurulentus* + *P. cometes* + *P. flavopunctatus* + *P. mooii* (closed triangle), *P. dilectus* (open circles), *P. fowleri* (stars), *P. pictus* (closed square) and *P. reticulatus* (open squares).

grey, becoming pale brown to hyaline anteriorly and posteriorly; dorsal fin with about two to four narrow pale grey stripes, these confined to distal half of dark purplish grey portion of fin; dark brown spots sometimes present distally between second dorsal spine and first segmented ray; caudal fin yellowish brown to dark brown basally, becoming hyaline to dusky hyaline posteriorly, dorsal and ventral margins of fin abruptly pale grey to white; pale grey to white areas sometimes bordered proximally with brown to dark grey-brown; pectoral fins hyaline; pelvic fins hyaline to dusky hyaline, paler on leading edge.

HABITAT AND DISTRIBUTION: *Pseudochromis alticaudex* is known only from eastern Indonesia, Papua New Guinea and the Solomon Ids (Figure 30). It has been collected from coral reefs in harbours and near mangrove areas at depths ranging to 7.5 m.

COMPARISONS: This species closely resembles and has been previously confused with the widespread West Pacific species *P. marshallensis* due to similar preserved colourations, meristic values and general morphology. It is distinguished from *P. marshallensis* in having modally fewer segmented dorsal-fin rays (24-25, usually 24 versus 24-27, usually 25), fewer scales in lateral series (31-36 versus 33-42, usually 35-39), fewer anterior lateral-line scales (18-25 versus 23-32), and more circumpeduncular scales (16-20, usually 20 versus 15-17, rarely 15 or 17). It also differs from *P. marshallensis* in usually lacking posterior interorbital pores (versus 1-2 pores always present in *P. marshallensis*). The presence of pale central spots on the scales of the sides of the body distinguishes *P. alticaudex* from all but a few pseudochromine species (e.g., *P. aurulentus, P. flavopunctatus, P. litus, P. pictus, P. reticulatus* and certain *Manonichthys* species). However, these species tend to have higher numbers of dorsal-fin rays, anal-fin rays, scales in lateral series and anterior lateral-line scales, and fewer circumpeduncular scales than *P. alticaudex* (Appendix 1).

REMARKS: *Pseudochromis alticaudex* is a relatively small species; the largest specimen examined measured 45.8 mm SL. The live coloration of the species is probably similar to that of *P. marshallensis*.

ETYMOLOGY: The specific epithet is from the Latin *altus*, high, and *caudex*, stem or trunk, with reference to the relatively high circumpeduncular scale count compared with similar species. Gender is masculine.

MATERIAL EXAMINED (additional to above type material): PAPUA NEW GUINEA: Nagada Harbour, CAS 65782, 12(0), 24.0-38.3 mm SL, CAS 65791, 1(0), 24.3 mm SL, CAS 65800, 6(0), 24.0-32.4 mm SL, CAS 75522, 1(0), 37.0 mm SL; Madang Harbour, Kranket Id, AMS I.17083-003, 1(0), 24.0 mm SL, USNM 290182, 8(0), USNM 290303, 1(0), USNM 290648, 2(0).

***Pseudochromis andamanensis* Lubbock**
Sunset Dottyback
Figure 30; Plate 4G

Pseudochromis andamanensis Lubbock, 1980: 821, fig. 1 (type locality: Campbell Bay, Similan Id, Andaman Sea); Gill & Randall, 1998: 18 (comparison); Gill, 1999b: 2565 (key).

DIAGNOSIS: *Pseudochromis andamanensis* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 22-25 (usually 24); segmented anal-fin rays 13-15 (usually 14); circumpeduncular scales 16; and second anal-fin spine much stouter than third. The presence of a bright yellow to orange (pale grey to pale brown in preservative) stripe or series of spots along the base of the dorsal fin is also distinctive for the species.

DESCRIPTION (based on 41 specimens, 21.6-45.5 mm SL): dorsal-fin rays III,22-25, last 8-25 segmented rays branched (all or all but first 1-2 branched in specimens larger than about 35 mm SL); anal-fin rays III,13-15, last 7-15 segmented rays branched (all or all but first 1-2 branched in specimens larger then about 30 mm SL); pectoral-fin rays 17-19; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 29-31; scales in lateral series 33-39; anterior lateral-line scales 24-32; anterior lateral line terminating beneath segmented dorsal-fin ray 15-20; posterior lateral-line scales 1-10 + 0-2; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 12-15 + 1 + 2-4 = 15-19; circumpeduncular scales 16; predorsal scales 15-24; scales behind eye 2-4; scales to preopercular angle 4-5; gill rakers 4-6 + 11-12 = 14-18; pseudobranch filaments 7-10; circumorbital pores 17-32; preopercular pores 9-17; dentary pores 4; posterior interorbital pores 1-3.

Lower lip incomplete; dorsal and anal fins without distinct scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from mid AIO pores to posterior nasal pores; opercle with 2-6 usually relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed on raker tips only; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1/1 + 1*/1 or S/S/S + 3/1 + 1/1/1/1/1/1/1/1 + 1; dorsal-fin spines moderately slender to moderately stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1/1 + 1*/1 + 1*/1; anal-fin spines moderately slender to stout and pungent, second spine much stouter than third; pelvic-fin spine moderately slender to moderately stout and pungent; second segmented pelvic-fin ray longer or subequal to third; caudal fin rounded, usually with posterior margin weakly rounded to truncate; vertebrae 10 + 16; epineurals 13-15; epurals 3.

Upper jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 5-7 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 24 specimens, 27.6-44.4 mm SL): head length 23.1-29.7; orbit diameter 7.9-10.9; snout

length 5.1-6.7; fleshy interorbital width 4.4-6.7; bony interorbital width 3.0-3.8; body width 11.1-13.2; snout tip to posterior tip of retroarticular bone 13.8-16.3; predorsal length 33.2-38.4; prepelvic length 31.6-36.0; posterior tip of retroarticular bone to pelvic-fin origin 18.5-21.0; dorsal-fin origin to pelvic-fin origin 23.8-29.0; dorsal-fin origin to middle dorsal-fin ray 28.8-32.6; dorsal-fin origin to anal-fin origin 36.9-42.5; pelvic-fin origin to anal-fin origin 27.2-33.0; middle dorsal-fin ray to dorsal-fin termination 22.1-27.1; middle dorsal-fin ray to anal-fin origin 24.0-29.3; anal-fin origin to dorsal-fin termination 30.3-34.8; anal-fin base length 22.3-28.2; dorsal-fin termination to anal-fin termination 13.7-17.9; dorsal-fin termination to caudal peduncle dorsal edge 11.1-13.4; dorsal-fin termination to caudal peduncle ventral edge 18.4-21.1; anal-fin termination to caudal peduncle dorsal edge 19.8-21.6; anal-fin termination to caudal peduncle ventral edge 12.8-14.8; first dorsal-fin spine 0.8-1.9; second dorsal-fin spine 3.5-5.3; third dorsal-fin spine 6.1-8.9; first segmented dorsal-fin ray 10.7-14.1; fourth last segmented dorsal-fin ray 13.8-18.0; first anal-fin spine 1.7-3.2; second anal-fin spine 7.4-8.9; third anal-fin spine 6.4-9.1; first segmented anal-fin ray 11.1-13.1; fourth last segmented anal-fin ray 11.9-16.0; third pectoral-fin ray 13.5-17.0; pelvic-fin spine 8.0-11.5; second segmented pelvic-fin ray 19.1-24.2; caudal-fin length 21.6-25.3.

Live coloration (based on photographs of specimens from the Andaman and Timor Seas, and on the colour description given by Lubbock, 1980; Plate 4G): head greenish yellow to orange, becoming greyish ventrally; narrow bright orange line extending around posterior and ventral margin of eye, this bordered posteriorly with pale to dark blue; iris light yellow to light brown with blue suboval ring around pupil; upper part of flanks on anterior part of body greenish yellow to bright orange, each scale within region with distal vertical grey to mauve stripe; greenish yellow to bright orange region sometimes extending posteriorly along dorsal fin base to end of fin; remainder of body greenish grey to pinkish grey or mauve, becoming steel blue posteriorly; pectoral-fin base bright yellow to bright orange; dorsal fin pinkish to greyish hyaline with bright yellow to orange basal stripe, series of horizontal to oblique wavy reddish lines, and blue distal margin; anal fin greyish hyaline to grey with several horizontal rows of red spots, and blue distal margin; caudal fin hyaline to pinkish hyaline dorsally and ventrally, remainder of fin mauve to steel blue with small red spots; pectoral fins hyaline to pinkish hyaline; pelvic fins pinkish hyaline to greyish hyaline with dark grey spine.

Preserved coloration: pattern similar to live coloration, greenish yellow to orange areas on head and body becoming pale yellowish brown to brown; grey to mauve areas becoming brown; dorsal fin brownish hyaline to hyaline, usually pale grey to white distally on anterior part of fin, with pale grey to pale brown stripe along basal part of fin, this sometimes broken into series of large spots; brownish hyaline to brown portion of fin usually with about three to eight pale grey to pale brown narrow stripes; anal fin brownish hyaline to hyaline with about two to six pale grey to pale brown narrow stripes and/or rows of small spots; caudal fin brown basally becoming greyish to brownish hyaline posteriorly; upper and lower edges of fin abruptly white to pale grey or pale brown; greyish to brownish hyaline portion of fin usually with scattered pale grey spots; pectoral fins hyaline; pelvic fins pale brown, sometimes with spine grey.

HABITAT AND DISTRIBUTION: *Pseudochromis andamanensis* was previously known only from the eastern Andaman Sea (Lubbock, 1980). Various museum specimens extend its range to include Bali (Indonesia) and the North West Shelf of Australia; it has also been photographed recently by H. Debelius in the Mentawai Ids, off the west coast of Sumatra, and by G.R. Allen at Weh Id, off the north coast of Sumatra (Figure 30). It has been observed (Lubbock, 1980: 823) and collected from rock and coral reefs at depths ranging from 1 to 35 m.

COMPARISONS: This species closely resembles the widespread West Pacific species *P. marshallensis* in general morphology and has been confused with that species in museum collections. It is distinguished from *P. marshallensis* in usually having fewer segmented dorsal-fin rays (22-25, usually 24 versus 24-27, usually 25), more segmented anal-fin rays (13-15, usually 14 versus 11-14, usually 13), and different live and preserved colourations [*P. marshallensis* usually has distinctive yellow to red (pale yellow to pale brown in preservative) spots on each body scale, which are lacking in *P. andamanensis*, whereas *P. andamanensis* differs from *P. marshallensis* in having a broad bright yellow to bright orange (pale grey to pale brown in preservative) basal stripe on the dorsal fin].

REMARKS: *Pseudochromis andamanensis* is a relatively small species; the largest specimen examined measured 48.2 mm SL. The live coloration, although described by Lubbock (1980), has not been illustrated previously.

ETYMOLOGY: The specific epithet is for the type locality.

MATERIAL EXAMINED: ANDAMAN SEA, THAILAND: Similan Ids, Similan Id, Campbell Bay, AMS I.20692-001, 1(1), 35.1 mm SL (paratype); BMNH 1979.1.9.2, 1(1), 44.0 mm SL (holotype), BMNH 1979.1.9.4-10, 7(0), 20.3-48.2 mm SL; USNM 219402, 1(1), 44.2 mm SL (paratype); Similan Ids, Bharngu Id, BPBM 22522, 1(1), 39.9 mm SL (paratype); Similan Ids, N side of Ko Miang, BPBM 22838, 3(3), 33.9-38.4 mm SL, BPBM 22587, 1(1), 21.6 mm SL; Similan Ids, Ko Huyong, USNM 292044, 10(1, 36.9 mm SL, subsequently cleared and stained), 28.8-41.1 mm SL; Ko Pipidon, W side of S lagoon, CAS 52307, 1(1), 39.0 mm SL. INDONESIA: Bali, Sanur Beach, NTM S.11203-004, 9(9), 31.3-45.5 mm SL. TIMOR SEA, AUSTRALIA: Ashmore Reef, NTM S.11973-078, 2(1, 34.8 mm SL), 14.5-34.8 mm SL, NTM S.11978-034, 1(1), 27.6 mm SL, NTM S.11980-019, 1(1), 31.3 mm SL, WAM P.29048-016, 5(5), 25.6-38.6 mm SL; Ashmore Reef, detached shoal 3 km NW of West Pass, AMS I.26746-046, 1(1), 25.0 mm SL (subsequently cleared and stained); Ashmore Reef, West Pass, WAM P.29044-052, 1(1), 36.0 mm SL; Ashmore Reef, outer reef 2 km N of North Shoal, WAM P.29051-021, 9(4, 42.3-45.0 mm SL), 18.9-45.0 mm SL; Ashmore Reef, East Pass, WAM P.29047-044, 2(2), 26.0-29.2 mm SL, WAM P.29049-022, 5(2, 30.3-38.6 mm SL), 19.4-38.6 mm SL; reef off N side of Cartier Id, AMS I.26752-022, 4(4), 28.1-35.1 mm SL.

Pseudochromis aureolineatus **sp. nov.**
Gold-lined Dottyback
Figure 31; Plate 4H

HOLOTYPE: ROM 67394, 43.6 mm SL, Federal Islamic Republic of Comores, Moheli, off NW tip of Chissioua Magnougi (12°23'30"S 43°38'20"E), steep reef slope with caves and heavy coral cover on calcareous rock, 21-30 m, R. Winterbottom, C. Buxton, W. Holleman and A. Marnewick, 25 November 1988.

PARATYPES: RUSI 30719, 2: 59.7-70.5 mm SL, Federal Islamic Republic of Comores, Moheli, Ile Ove ne Ou, reef, 15-25 m, P.C. Heemstra et al., 21-22 October 1986.

DIAGNOSIS: *Pseudochromis aureolineatus* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 26-27; segmented anal-fin rays 15-16; scales in lateral series 41-43; caudal fin emarginate to strongly emarginate; in preservative, dark greyish brown spot on opercular flap; upper part of head and body dark greyish brown, the remainder of head and body abruptly pale yellowish brown; no dark spots on dorsal fin.

DESCRIPTION (based on three specimens, 43.6-70.5 mm SL; minimum and maximum value ranges given first for all type specimens, followed, where different, by values for holotype enclosed in parentheses): dorsal-fin rays III,26-27 (III,26), all or all but first segmented rays branched; anal-fin rays III,15-16 (III,15), all segmented rays branched; pectoral-fin rays 19; upper procurrent caudal-fin rays 7-8 (8); lower procurrent caudal-fin rays 7; total caudal-fin rays 31-32 (32); scales in lateral series 41-43 (42/43); anterior lateral-line scales 32-35 (32/35); anterior lateral line terminating beneath segmented dorsal-fin ray 19-21 (20/21); posterior lateral-line scales 5-9 + 0-1 (9 + 0/8 + 1); scales between lateral lines 3-4 (4/3); horizontal scale rows above anal-fin origin 13-15 + 1 + 3 = 17-19 (14 + 1 + 3/13 + 1 + 3); circumpeduncular scales 20; predorsal scales 19-20 (19); scales behind eye 3-4 (4); scales to preopercular angle 4-6 (6); gill rakers 5-7 + 12-13 = 17-20 (7 + 13); pseudobranch filaments 11-12 (12); circumorbital pores 20-36 (23/20); preopercular pores 13-22 (16/13); dentary pores 4; posterior interorbital pores 1-2 (1).

Lower lip incomplete; dorsal and anal fins without distinct scale sheaths, although with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from mid AIO pores to anterior AIO pores; opercle with 5-6 moderately strong serrations; teeth of outer ceratobranchial-1 gill rakers well developed mainly on raker tips only, although with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1 + 1*/1 + 1* (S/S/S + 3/1 + 1/1/1/1/1/1 + 1); dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 +1*/1/1 + 1 (3/1 + 1/1/1/1 + 1/1 + 1); anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout and pungent; second segmented pelvic-fin ray longest; caudal fin emarginate to strongly emarginate; vertebrae 10 + 16; epineurals 15-16 (16); epurals 3.

Upper jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 3-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on two specimens, 43.6-59.7 mm SL): head length 24.3-24.8 (24.8); orbit diameter 8.4-8.5 (8.5); snout length 6.0-6.7 (6.0); fleshy interorbital width 4.9-5.0 (5.0); bony interorbital width 3.0-3.4 (3.0); body width 11.5-11.6 (11.5); snout tip to posterior tip of retroarticular bone 14.0-14.4 (14.0); predorsal length 32.1-33.5 (32.1); prepelvic length 30.8-31.0 (31.0); posterior tip of retroarticular bone to pelvic-fin origin 17.1-17.9 (17.9); dorsal-fin origin to pelvic-fin origin 27.3-29.6 (27.3); dorsal-fin origin to middle dorsal-fin ray 34.7-35.8 (35.8); dorsal-fin origin to anal-fin origin 42.2-43.0 (42.2); pelvic-fin origin to anal-fin origin 31.9-34.8 (31.9); middle dorsal-fin ray to dorsal-fin termination 24.8-25.1 (24.8); middle dorsal-fin ray to anal-fin origin 23.8-25.8 (23.8); anal-fin origin to dorsal-fin termination 31.4-34.8 (31.4); anal-fin base length 25.2-28.3 (25.2); dorsal-fin termination to anal-fin termination 15.1-16.1 (16.1); dorsal-fin termination to caudal peduncle dorsal edge 10.2-11.5 (11.5); dorsal-fin termination to caudal peduncle ventral edge 18.3-19.0 (19.0); anal-fin termination to caudal peduncle dorsal edge 19.4-21.1 (21.1); anal-fin termination to caudal peduncle ventral edge 12.1-13.1 (13.1); first dorsal-fin spine 3.0; second dorsal-fin spine 6.0-6.2 (6.0); third dorsal-fin spine 7.9-8.9 (8.9); first segmented dorsal-fin ray 12.6-13.2 (12.6); fourth last segmented dorsal-fin ray 16.4-17.9 (17.9); first anal-fin spine 2.2-3.2 (3.2); second anal-fin spine 4.9-5.5 (5.5); third anal-fin spine 6.9; first segmented anal-fin ray 9.9-10.4 (9.9); fourth last segmented anal-fin ray 17.1-17.4 17.4); third pectoral-fin ray 14.9-15.6 (14.9); pelvic-fin spine 10.1-10.8 (10.8); second segmented pelvic-fin ray 19.1-27.1 (27.1); caudal-fin length 26.3-26.6 (26.6).

Live coloration (based on a photograph of the holotype when freshly dead; Plate 4H): head and body pale pink, becoming white ventrally on head, and pinkish grey posteriorly; bright yellow stripe extending from posterodorsal edge of eye, above gill opening, and along upper part of body beneath dorsal fin to dorsal edge of caudal peduncle; dorsal contour of head and body above yellow stripe dark bluish grey; opercular flap with dark bluish grey spot, this edged posteriorly with yellow; anterior part of lips bluish grey, remainder pale pink, with pinkish brown bar immediately behind posterior edge of maxilla; small bright yellow spot on anteroventral edge of eye; iris bright lemon yellow, with blue suboval ring around pupil; anterior few scales of horizontal scale rows immediately beneath yellow stripe each with dark bluish grey basal spot; sides of body behind pectoral-fin base with series of narrow pinkish grey oblique lines following myosepta positions; dorsal-fin greyish hyaline on spinous portion, and on basal half to two-thirds of segmented part of fin, remainder of fin pinkish hyaline to hyaline; anal fin greyish to pinkish hyaline; caudal fin pinkish grey basally, becoming greyish hyaline

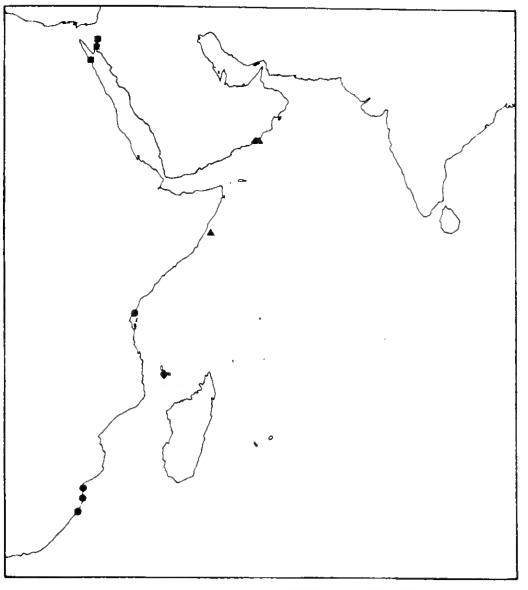

Figure 31. Distributional records for *Pseudochromis aureolineatus* (diamond), *P. melas* (closed circles), *P. pesi* (squares) and *P. punctatus* (triangles).

proximally, with short blue-grey stripe extending submarginally from dorsal part of caudal-fin base; dorsal edge of caudal fin yellowish grey to yellow; pectoral and pelvic fins pinkish to yellowish hyaline.

Preserved coloration: pattern similar to live coloration, dark bluish grey areas on head and body, including spot on opercular flap, becoming dark greyish brown; remainder of head and body, including yellow stripe, becoming pale yellowish brown; caudal fin yellowish brown basally, becoming yellowish hyaline to hyaline distally; blue-grey stripe on caudal fin becoming greyish brown; other fins whitish or yellowish to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis aureolineatus* is known only from the type specimens, which were collected from reefs and reef slopes in 15-30 m in Moheli, Federal Islamic Republic of Comores (Figure 31).

COMPARISONS: *Pseudochromis aureolineatus* closely resembles *P. melas* from the E coast of Africa, *P. pesi* from the Red Sea, and *P. punctatus* from southern Oman and off the coast of Somalia. These species differ from other pseudochromines in having the following characters: segmented dorsal-fin rays 25-27 (usually 26); segmented anal-fin rays 14-16 (usually 15); scales in lateral series 39-45; and (except in the dark form of *P. melas*) similar preserved colourations (dark spot on opercular flap; upper part of head and body brown to dark greyish brown, the remainder of head and body abruptly pale yellow to pale brown). The four species are distinguished by body depth (middle dorsal-fin ray to anal-fin origin 23.8-25.8 % SL for *P. aureolineatus*, 26.3-30.0 % SL for *P. melas*, 25.7-27.5 SL % for *P. pesi*, and 23.1-25.0 % SL for *P. punctatus*), number of pectoral-fin rays (19 in *P. aureolineatus*, 18-20, usually 19 in *P. melas*, 17-18 in *P. pesi*, and 17-19, usually 18 in *P. punctatus*), caudal fin length (26.3-26.6 % SL in *P. aureolineatus*, 25.4-29.2 % SL in *P. melas*, 28.9-31.6 % SL in *P. pesi*, and 27.5-31.6 % SL in *P. punctatus*), length of fourth last anal-fin ray (17.1-17.4 % SL in *P. aureolineatus*, 13.1-18.8 % SL in *P. melas*, 18.5-22.6 % SL in *P. pesi* and 16.5-22.2 % SL in *P. punctatus*), caudal-fin shape (emarginate to strongly emarginate in *P. aureolineatus* versus rounded to truncate in the other species), dorsal-fin coloration (dark spots absent in *P. aureolineatus* versus present in the other species), and anal-fin coloration (dark spotted in *P. melas* and *P. puntatus* versus unspotted in *P. pesi* and *P. aureolineatus*). *Pseudochromis melas* further differs from the other species in having a dark colour form in which the head and body are uniformly dark brown in preservative.

REMARKS: *Pseudochromis aureolineatus* is a moderately large species; the largest known specimen measured 70.5 mm SL. Gill & Randall (1994: 17) discussed the species as "an undescribed species from the Comoros" in a comparison with *P. punctatus*.

ETYMOLOGY: The specific epithet is from the Latin *aurum*, gold, and *linea*, line, and alludes to the distinctive yellow stripe on the head and body.

MATERIAL EXAMINED: See above.

Pseudochromis aurulentus Gill & Randall

Goldhead Dottyback
Figure 30; Plate 4I

Pseudochromis aurulentus Gill & Randall, 1998: 18, fig. 1 (type locality: off Turo Liu Point, Komodo Id, Indonesia); Gill, 1999b: 2566 (key).

DIAGNOSIS: *Pseudochromis aurulentus* is distinguished from congeners by the following combination of characters: dorsal-fin rays III,27, all segmented rays branched; anal-fin rays III,15; circumpeduncular scales 16; caudal fin rounded; and pectoral-fin axil with a dark greyish brown spot (bluish grey in life).

DESCRIPTION (based on three specimens, 42.7-54.6 mm SL): dorsal-fin rays III,27, all segmented rays branched; anal-fin rays III,15, all segmented rays branched; pectoral-fin rays 18-19; upper procurrent caudal-fin rays 7-8; lower procurrent caudal-fin rays 7-8; total caudal-fin rays 31-33; scales in lateral series 38-39; anterior lateral-line scales 27-32; anterior lateral line terminating beneath segmented dorsal-fin ray 18-22; posterior lateral-line scales 6-13 + 1; scales between lateral lines 3; horizontal scale rows above anal-fin origin 12-14 + 1 + 3 = 16-18; circumpeduncular scales 16; predorsal scales 21-26; scales behind eye 2-3; scales to preopercular angle 5; gill rakers 6-7 + 12-13 = 18-20; pseudobranch filaments 11-12; circumorbital pores 23-33; preopercular pores 12-16; dentary pores 4-5; posterior interorbital pores 1-2.

Lower lip weakly interrupted at symphysis; dorsal and anal fins without scale sheaths; predorsal scales extending anteriorly to point ranging from anterior A1O pores to posterior nostrils; opercle with 5 moderately distinct serrations serrations; teeth of outer ceratobranchial-1 gill rakers mostly weakly to moderately developed, with well-developed teeth confined to raker tips; anterior dorsal-fin pterygiophore formula S/S/S + 3/

1 + 1/1/1/1 +1/1/1 or S/S/S + 3/1 + 1/1/1/1/1 + 1*/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1; anal-fin spines stout and pungent, second spine much stout than third; pelvic-fin spine moderately stout and pungent; second segmented pelvic-fin ray longest; caudal fin rounded; vertebrae 10 + 16; epineurals 13-15; epurals 3.

Upper jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 3-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL: head length 23.6-24.8; orbit diameter 8.9-9.5; snout length 5.9-6.8; fleshy interorbital width 5.7-6.8; bony interorbital width 4.0-4.8; body width 12.3-13.0; snout tip to posterior tip of retroarticular bone 13.6-14.5; predorsal length 31.0-32.5; prepelvic length 30.9-32.1; posterior tip of retroarticular bone to pelvic-fin origin 18.3-19.9; dorsal-fin origin to pelvic-fin origin 27.8-29.7; dorsal-fin origin to middle dorsal-fin ray 27.2-28.6; dorsal-fin origin to anal-fin origin 41.5-45.1; pelvic-fin origin to anal-fin origin 28.1-31.7; middle dorsal-fin ray to dorsal-fin termination 24.1-24.9; middle dorsal-fin ray to anal-fin origin 27.2-28.6; anal-fin origin to dorsal-fin termination 34.6-36.0; anal-fin base length 27.3-28.3; dorsal-fin termination to anal-fin termination 16.4-17.0; dorsal-fin termination to caudal peduncle dorsal edge 11.0-12.2; dorsal-fin termination to caudal peduncle ventral edge 20.0-20.5; anal-fin termination to caudal peduncle dorsal edge 21.2-21.6; anal-fin termination to caudal peduncle ventral edge 12.1-13.6; first dorsal-fin spine 2.4-2.8; second dorsal-fin spine 4.8-5.9; third dorsal-fin spine 7.1-8.2; first segmented dorsal-fin ray 11.0-13.3; fourth last segmented dorsal-fin ray 14.8-17.6; first anal-fin spine 2.2-2.4; second anal-fin spine 4.6-4.9; third anal-fin spine 6.6-6.8; first segmented anal-fin ray 10.4-11.7; fourth last segmented anal-fin ray 14.8-16.4; third pectoral-fin ray 15.5-16.2; pelvic-fin spine 10.8-11.7; second segmented pelvie-fin ray 22.9-26.9; caudal-fin length 25.6-29.5.

Live coloration (based on underwater photographs of the holotype; Plate 4I): head and anterior part of body bright golden orange, becoming pinkish orange ventrally on abdomen, and bluish grey dorsally and on posterior part of body; scales on cheek and upper part of operculum diffusely bluish grey on bases; snout greenish orange; bright blue curved streak extending around posterior and ventral rim of orbit to middle of upper lip; iris greyish yellow to golden, with bright blue suboval ring around pupil; scales of nape and body each with a dark blue basal spot bordered posteriorly by a golden orange to golden spot, golden orange to gold spots best developed along anterior lateral line and on dorsoanterior part of body, becoming indistinct ventrally on abdomen (merging with pinkish orange coloration) and posteriorly behind anal-fin origin; prominent dark bluish grey spot on pectoral-fin axil, this extending ventrally as indistinct bar along upper half of fin base; dorsal and anal fins greyish to orangish hyaline, darker basally, with narrow golden line along dorsal-fin base, this most prominent anteriorly, becoming inconspicuous and breaking into spots on posterior part of fin base; caudal fin bluish grey basally, becoming greyish hyaline posteriorly, upper and lower borders of fins broadly orangish hyaline, with distal margin of fin narrowly greyish blue; pectoral fins orangish hyaline; pelvic fins yellowish hyaline, becoming bright bluish white on fin tips.

Preserved coloration: pattern similar to live coloration, golden to orange markings becoming pale yellowish brown; blue markings becoming greyish brown to dark greyish brown; bluish grey markings becoming pale brown to brown.

HABITAT AND DISTRIBUTION: *Pseudochromis aurulentus* is known only from the three type specimens from Komodo Id, Indonesia (Figure 30). They were collected from reefs in 14-21 m.

COMPARISONS: *Pseudochromis aurulentus* resembles *P. pylei* from eastern Indonesia and Belau and *P. flavopunctatus* from Komodo Id in most meristic and morphometric details and in having a dark spot on the axil of the pectoral fin. It differs from these species in having: segmented dorsal-fin rays 27 (versus 25-27, usually 26 in *P. pylei* and *P. flavopunctatus*); segmented anal-fin rays 15 (versus 14-15 in *P. pylei* and 16 in *P. flavopunctatus*); horizontal scale rows above anal-fin origin 12-14 + 1 + 3 = 16-18 (versus 12-13 + 1 + 2-4 = 15-18 in *P. pylei* and 10-12 + 1 + 2-3 = 13-16 in *P. flavopunctatus*); anal-fin origin to middle dorsal-fin ray 27.2-28.6 % SL (versus 22.5-27.1 % SL in *P. pylei* and 26.4-29.1 % SL in *P. flavopunctatus*); and dorsal-fin termination to anal-fin termination 16.4-17.0 % SL (versus 14.3-16.1 % SL in *P. pylei* and 15.1-16.9 % SL in *P. flavopunctatus*). Moreover, the three species differ markedly in live coloration.

The live coloration of *P. aurulentus*, particularly the presence of a narrow golden line along the dorsal-fin base, might lead to confusion with the eastern Indian Ocean species *P. andamanensis*. However, *P. andamanensis* differs from *P. aurulentus* in having 22-25, usually 24 (versus 27) segmented dorsal-fin rays and 13-15, usually 14 (versus 15) segmented anal-fin rays. Moreover, *P. andamanensis* lacks either a dark spot on the pectoral-fin axil or golden spots on the anterior body scales.

REMARKS: A live colour photograph of the holotype of *P. aurulentus* is provided by Gill & Randall (1998).

ETYMOLOGY: The specifie epithet is from the Latin meaning "golden" or "ornamented with gold," and alludes to the coloration of the head and anterior part of the body.

MATERIAL EXAMINED: INDONESIA: Komodo Id, off Turo Liu Point, NE corner of Slawi Bay, BPBM 36506, 1(1), 45.3 mm SL (holotype); Komodo Id, SE corner near Lehoksera Bay (08°43'S 119°27'S), WAM P.30957-001, 2(2), 42.7-54.6 mm SL (paratypes).

***Pseudochromis bitaeniatus* (Fowler)**
Two-lined Dottyback
Figures 24B, 32; Plates 4J, 5A; Table 4

Dampieria (Bartschina) bitaeniata Fowler, 1931b: 18, fig. 4 (type locality: Galera Bay, Mindoro, Philippines).

Dampieria bitaeniata; Roxas & Martin, 1937: 124 (list); Herre, 1953: 370 (list).

Pseudochromis bitaeniatus; Allen, 1985: 2508 (list, Western Australia); Allen & Russell, 1986: 85 (list, Scott Reef, Timor Sea); Kailola, 1987: 243 (list, Los Negros Id, Papua New Guinea); Paxton et al., 1989: 519 (list; distribution); Randall et al., 1990: 126 (description; distribution; colour fig.); Burgess et al., 1991: 202 (colour fig.); Fosså & Nilsen, 1993: 127 (colour fig.); Lieske & Myers, 1994: pl. 32, fig. 5 (colour fig.; habitat; distribution); Kuiter & Debelius, 1994: 112 (colour fig.; habitat and distribution); Eichler & Myers, 1997: 119 (distribution; colour fig.); Gill, 1997: 126 (description; distribution; colour fig.); Myers, 1999: 121, 297, pl. 48A (description; distribution; colour fig.); Gill, 1999b: 2564 (key).

Pseudochromis bitaeniata; Burgess et al., 1988: pl. 152 (colour fig.); Kuiter, 1992: 42, fig. f (colour fig.; habitat and distribution); Allen, 1997: 96, pl. 29-16 (description; distribution; colour fig.).

DIAGNOSIS: *Pseudochromis bitaeniatus* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 25-27 (usually 26); segmented anal-fin rays 14; second anal-fin spine much stouter than the third; scales in lateral series 42-47; gill rakers 3-6 + 11-13 = 15-18; and circumpeduncular scales 18-20.

DESCRIPTION (based on 39 specimens, 22.8-58.1 mm SL): dorsal-fin rays III,25-27, last 1-27 segmented rays branched (all or all but first branched in specimens larger than about 40 mm SL); anal-fin rays III,14, last 3-14 segmented rays branched (all or all but first 1-2 branched in specimens larger than about 30 mm SL); pectoral-fin rays 16-18; upper procurrent caudal-fin rays 6-8; lower procurrent caudal-fin rays 6-8; total caudal-fin rays 29-33; scales in lateral series 42-47; anterior lateral-line scales 27-35; anterior lateral line terminating beneath segmented dorsal-fin ray 13-20; posterior lateral-line scales 0-15 + 0-2; scales between lateral lines 4-5; horizontal scale rows above anal-fin origin 13-15 + 1 + 2-4 = 17-19; circumpeduncular scales 18-20; predorsal scales 18-24; scales behind eye 2-4; scales to preopercular angle 4-7; gill rakers 3-6 + 11-13 = 15-18; pseudobranch filaments 7-12; circumorbital pores 14-29; preopercular pores 8-14; dentary pores 4-5; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of posterior AIO pores to anterior AIO pores; opercle with 4-7 usually well-developed serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or well developed on raker tips only; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1 + 1*/1; dorsal-fin spines moderately stout to stout, tips pungent; anterior anal-fin pterygiophore formula 3/1/1 + 1/1/1 + 1/1/1 + 1; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout and pungent; second segmented pelvic-fin ray longest; caudal fin angular with upper, lower and mid rays weakly to moderately produced to give a rhomboid to trifurcate shape; vertebrae 10 + 16; epineurals 13-14; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 3-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 22 specimens, 24.1-58.1): head length 23.1-29.3; orbit diameter 6.9-10.7; snout length 6.2-8.1; fleshy interorbital width 4.8-6.3; bony interorbital width 3.2-4.5; body width 9.8-11.9; snout tip to posterior tip of retroarticular bone 14.2-18.0; predorsal length 31.7-37.7; prepelvic length 30.6-33.9; posterior tip of retroarticular bone to pelvic-fin origin 17.2-19.8; dorsal-fin origin to pelvic-fin origin 23.4-27.8; dorsal-fin origin to middle dorsal-fin ray 30.3-34.9; dorsal-fin origin to anal-fin origin 37.3-41.9; pelvic-fin origin to anal-fin origin 27.8-33.8; middle dorsal-fin ray to dorsal-fin termination 22.6-26.3; middle dorsal-fin ray to anal-fin origin 22.3-26.2; anal-fin origin to dorsal-fin termination 30.9-34.4; anal-fin base length 23.6-26.9; dorsal-fin termination to anal-fin termination 13.3-15.8; dorsal-fin termination to caudal peduncle dorsal edge 11.1-13.1; dorsal-fin termination to caudal peduncle ventral edge 17.3-19.7; anal-fin termination to caudal peduncle dorsal edge 19.4-21.1; anal-fin termination to caudal peduncle ventral edge 12.5-14.8; first dorsal-fin spine 0.9-2.2; second dorsal-fin spine 3.4-5.8; third dorsal-fin spine 5.7-8.3; first segmented dorsal-fin ray 10.3-13.3; fourth last segmented dorsal-fin ray 13.7-17.0; first anal-fin spine 1.6-2.9; second anal-fin spine 6.0-8.1; third anal-fin spine 6.1-8.9; first segmented anal-fin ray 10.7-12.7; fourth last segmented anal-fin ray 13.1-15.1; third pectoral-fin ray 10.6-14.7; pelvic-fin spine 8.4-11.3; second segmented pelvic-fin ray 18.5-24.4; caudal-fin length 23.2-31.0.

Live coloration (based on photographs of specimens from the Philippines, Indonesia, Timor Sea, Belau, Papua New Guinea and the Solomon Ids; Plate 5A): dorsal contour of head varying from yellowish brown to dark brown or dark grey, remainder of head yellowish brown to pale yellow, usually becoming reddish to purplish brown posteriorly; dark brown to dark grey or black oblique stripe extending from posterodorsal edge of eye onto midupper part of body; posterior and ventral part of orbital rim yellow to orange, becoming bright orange to bright red or purple ventrally, this edged on vertical portion by short vertical dark grey to black bar; posteroventral rim of orbit outside these markings edged by pale blue to mauve curved line; iris pale yellow to bright orange or red with bright blue suboval ring around pupil; dorsal contour of anterior part of body yellowish brown to brown;

dark brown to dark grey or black stripe from behind eye, becoming broader posteriorly and extending along upper part of body beneath dorsal fin base to dorsal third of caudal peduncle; second broad dark stripe extending from in front of pectoral-fin base along ventral part of body to lower third of caudal peduncle; stripe more diffuse and usually reddish to maroon anteriorly, becoming dark grey to black posteriorly; area between stripes pale pink to pale grey or white, becoming more intensely white posteriorly; ventral edge of anterior part of body beneath lower dark stripe yellowish to reddish brown; anterior and distal part of dorsal fin yellow to orange, this becoming indistinct posteriorly; distal margin of fin sometimes bright blue; remainder of fin yellowish or greyish hyaline to dark greenish grey, sometimes with basal edge narrowly pale pink to white, and sometimes with several fine indistinct red to grey horizontal to oblique stripes; anal fin yellowish or greyish hyaline to grey, usually with basal edge pale grey to grey; series of fine red to grey horizontal stripes present on basal two-thirds of fin; black caudal peduncle stripes extending onto caudal fin to midupper and midlower ray tips, becoming narrower posteriorly; area between stripes bright white; areas above and below stripes hyaline or whitish hyaline to dark greyish hyaline, sometimes with outer edges of stripes edged with yellow to bright orange; pectoral fins pinkish or greyish hyaline to hyaline; pelvic fins pale pink to hyaline. Large specimens (based on photographs of specimens from the Solomon Ids and Indonesia; Plate 5A): similar to above except for head and body more-or-less uniform bluish grey, upper dark stripe indistinctly present as diffuse dark brownish area on dorsal half of body, lower dark stripe present as diffuse reddish to pinkish grey area extending from behind pectoral-fin base to caudal peduncle; dorsal contour of body above upper dark stripe sometimes greyish yellow; dorsal fin dark bluish grey with indistinct reddish grey oblique stripes at posterior of fin; anal fin dark bluish grey with two or three reddish grey horizontal stripes on basal half of fin; caudal fin grey, greyish white dorsally and ventrally, dark stripes indistinctly present as diffuse dusky grey areas.

Preserved coloration: pattern similar to live coloration, head and body becoming whitish to yellowish brown, darker dorsally; dark stripes on body becoming dark brown to dark grey, these usually inconspicuous or absent in specimens larger than about 45-50 mm SL; midposterior rim of orbit dark brown to black; dorsal fin dusky brown to brownish hyaline, paler anteriorly and distally, usually with inconspicuous pale grey to pale brown horizontal to oblique stripes basally; anal fin dusky hyaline with pale grey longitudinal stripes on basal part of fin; caudal fin pale yellowish brown, dark stripes from body extending to posterior of fin and becoming dark brown to black; outer edges of fin and posterior of fin between stripes greyish white; pectoral fins hyaline; pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis bitaeniatus* is relatively widely distributed throughout the tropical West Pacific (Figure 32), ranging from the Philippines south to Indonesia and the North West Shelf of Australia, and east to New Britain and the Solomon Ids. Records from the following localities are on the basis of underwater photographs and sight records: Belau (photograph by H.R. Lubbock); Helen Atoll (photograph record by R.F. Myers; Myers, 1999); Togian Ids, Sulawesi (photograph by R.H. Kuiter); Biak, Irian Jaya (photograph by G. Barrall); and Lizard Id, Great Barrier Reef (photograph by J.E. Randall). Randall's photograph is given

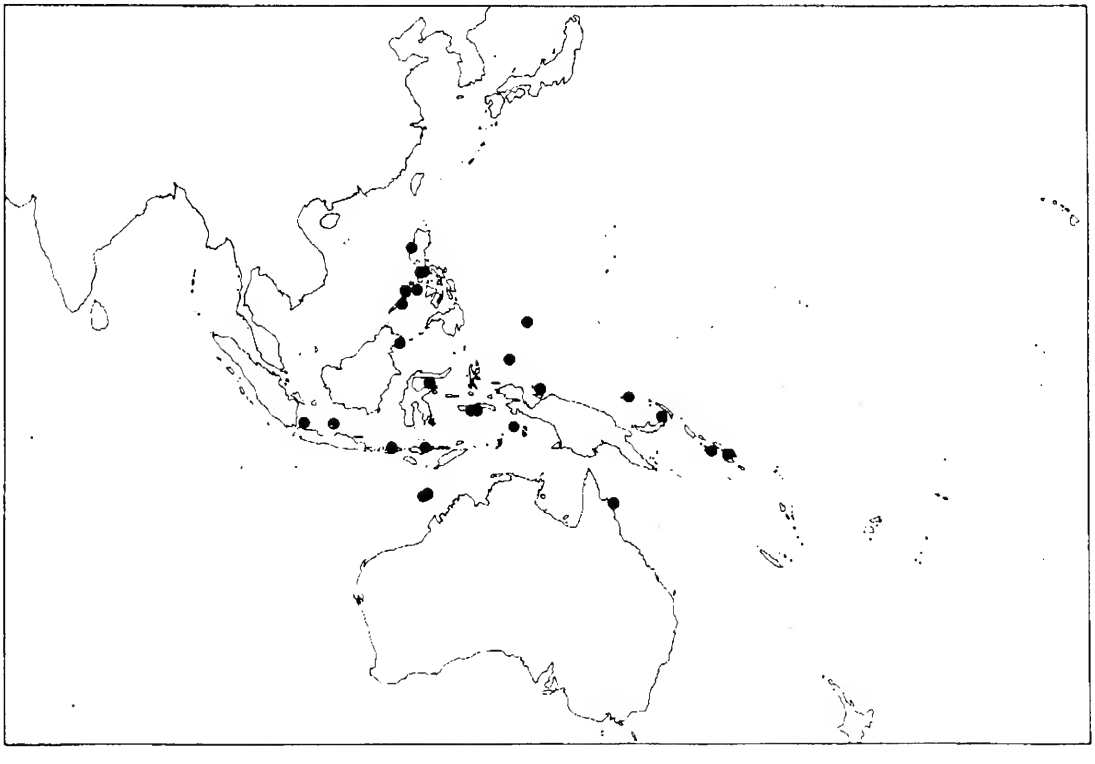

Figure 32. Distributional records for *Pseudochromis bitaeniatus*.

in Randall et al. (1990) and Gill (1997). *Pseudochromis bitaeniatus* has been collected from coral and rock reefs in lagoons and on reef slopes and dropoffs at depths ranging from 2 to 38 m.

COMPARISONS: *Pseudochromis bitaeniatus* is distinguished from all other pseudochromines in having the following character combination: segmented dorsal-fin rays 25-27 (usually 26); segmented anal-fin rays 14; second anal-fin spine much stouter than the third; scales in lateral series 42-47; gill rakers 3-6 + 11-13 = 15-18; and circumpeduncular scales 18-20. When present, the dark stripes on the body and caudal fin are also distinctive for the species. Similar dark stripes are otherwise found among pseudochromines in *P. sankeyi* from the southern Red Sea and Gulf of Aden, which differs in having the upper dark stripe extend anteriorly through the eye to the upper lip (versus to the dorsoposterior edge of the eye in *P. bitaeniatus*) and more gill rakers (6-8 + 15-16 = 21-24). The non-striped colour form in life may be confused with *P. ransonneti* from western Indonesia, Singapore and Gulf of Thailand. However, *P. ransonneti* has fewer segmented dorsal-fin rays (23-24) and fewer scales in lateral series (36-39).

REMARKS: *Pseudochromis bitaeniatus* is a moderate-sized species; the largest specimen examined measured 58.1 mm SL. Live colour illustrations of the species are provided in Burgess et al. (1988, 1991), Randall et al. (1990), Kuiter (1992), Fosså & Nilsen (1993), Kuiter & Debelius (1994), Eichler & Myers (1997) and Gill (1997).

Although Fowler (1931b) recorded the absence of palatine teeth in the original description of this species, the holotype and all other specimens examined have elongate patches of small conical teeth on the palatines.

Lieske & Myers (1994: 32) suggested that this species might be a mimic of juveniles of the pholidichthyid *Pholidichthys leucotaenia* Bleeker. However, the similarity in form and coloration is weak and a mimetic relationship has not been substantiated. Moreover, it seems likely that, based on similarity in coloration, form and schooling behaviour, juvenile *P. leucotaenia* mimic the venomous-spined plotosid catfish *Plotosus lineatus* (Thunberg).

Pseudochromis bitaeniatus is a relatively widespread species. However, it exhibits pronounced geographic variation in several meristic characters (Table 4) and it is likely that further study will warrant division of the species as currently recognised into two or more species.

A 38.4 mm SL *Pseudochromis* specimen (BPBM 36253) recently collected by J.L. Earle off Wahawe Point, Milne Bay, Papua New Guinea, is tentatively identified as *P. bitaeniatus*; however, it differs from all other *P. bitaeniatus* specimens examined in having 49-50 (versus 42-47) scales in lateral series.

Table 4. Frequency distibutions for selected meristic characters of *Pseudochromis bitaeniatus* from different localities.

	Seg. D rays				Scales in lateral series							Sc. betw. lat. lines		
	25	26	27	$\bar{x}$	42	43	44	45	46	47	$\bar{x}$	4	5	$\bar{x}$
Luzon	-	2	-	26.0	-	1	2	1	-	-	44.0	4	-	4.0
Cuyo Islands	-	5	1	26.2	2	3	3	4	-	-	43.8	7	1	4.1
Palawan	-	1	-		-	1	1	-	-	-	43.5	-	2	5.0
Sabah	-	1	-		-	1	-	1	-	-	44.0	1	-	
Moyo Island	1	2	-	25.7	1	-	2	1	2	-	44.5	4	2	4.3
Flores	1	-	-		1	1	-	-	-	-	42.5	-	2	5.0
Ambon	-	3	-	26.0	-	4	1	1	-	-	43.5	4	2	4.3
Saparua	-	2	-	26.0	1	1	-	-	-	2	44.8	-	2	5.0
Kai Islands	-	1	-		-	-	1	1	-	-	44.5	-	2	5.0
Hibernia Reef	-	2	-	26.0	1	-	3	-	-	-	43.5	1	3	4.8
Scott Reef	1	7	1	26.0	1	3	1	7	4	1	44.8	6	4	4.4
New Britain	-	1	-		-	-	-	2	-	-	45.0	2	-	4.0
Solomon Islands	1	3	3	26.3	-	-	6	3	4	1	45.0	-	14	5.0

	Upper gill rakers					Lower gill rakers				Total gill rakers				
	3	4	5	6	$\bar{x}$	11	12	13	$\bar{x}$	15	16	17	18	$\bar{x}$
Luzon	1	1	-	-	3.5	-	2	-	12.0	1	1	-	-	15.5
Cuyo Islands	-	3	3	-	4.5	-	6	-	12.0	-	3	3	-	16.5
Palawan	-	-	1	-		-	1	-		-	-	1	-	
Sabah	-	1	-	-		-	1	-		-	1	-	-	
Moyo Island	-	2	1	-	4.3	-	1	2	12.7	-	1	1	1	17.0
Flores	-	1	-	-		-	1	-		-	1	-	-	
Ambon	-	-	3	-	5.0	-	3	-	12.0	-	-	3	-	17.0
Saparua	-	1	1	-	4.5	1	1	-	11.5	-	1	-	1	17.0
Kai Is	-	-	1	-		-	1	-		-	-	1	-	
Hibernia Reef	-	1	1	-	4.5	-	2	-	12.0	-	1	1	-	16.5
Scott Reef	-	4	4	1	4.7	-	8	1	12.1	-	4	3	2	16.8
New Britain	-	1	-	-		-	-	1		-	-	1	-	
Solomon Islands	3	4	-	-	3.6	-	4	3	12.4	2	3	2	-	16.0

It is also unusual in having a relatively dark coloration more typical of larger (greater than 45-50 mm SL) specimens of *P. bitaeniatus*. Because its identity is uncertain, it was not used in the above description of *P. bitaeniatus*.

ETYMOLOGY: The specific epithet is from the Latin *bi*, two, and *taenia*, ribbon, with reference to the dark stripes on the body and caudal fin.

MATERIAL EXAMINED: PHILIPPINES: Bolinao Lagoon, USNM 232037, 1(0); Luzon, channel W of Santiago Id, AMS I.21903-062, 1(1), 36.0 mm SL; Mindoro, Galera Bay, USNM 89990, 1(1), 46.7 mm SL (holotype); Marinduque, Santa Cruz Id, USNM 144578, 1(0) (paratype); Palawan, El Nido, YCM P.12094, 1(1), 47.5 mm SL; Palawan, Puerto Princesa, USNM 290451, 1(0); Palawan, Puerto Princesa, White Beach, USNM 290771, 2(0); Cuyo Ids, Bararin Id, USNM 290765, 4(4), 42.2-58.1 mm SL, USNM 290349, 2(0); Cuyo Ids, Tagauayan Id, USNM 230400, 2(2), 45.4-46.5 mm SL. SABAH, MALAYSIA: Darval Bay, Pulau Bohidulong, USNM 290107, 1(1), 43.2 mm SL. INDONESIA: Molucca Ids, Ambon Id, off Tandjung Suli, USNM 209740, 3(3), 29.1-49.4 mm SL; Molucca Ids, Saparua Id, reef off Kulor, USNM 210338, 2(2), 24.1-31.4 mm SL; Pulau Seribu, Pulau Ajer, USNM 290756, 1(0); Karimundjawa Ids, SW of Karimundjawa Id, USNM 278137, 2(0); Karimundjawa Ids, N of Lesser Mendjangan Id, USNM 278108, 1(0); Sumbawa Id, Moyo Id, CAS 61757, 3(3), 31.9-46.4 mm SL; Flores Id, Pulau Besar, CAS 62502, 1(1), 34.3 mm SL; Kai Ids, Tayandu Id, USNM 246234, 1(1), 50.4 mm SL. NORTH-WESTERN AUSTRALIA: Timor Sea, Hibernia Reef, WAM P.30844-006, 2(2), 53.6-53.8 mm SL; Timor Sea, Scott Reef, NTM S.11370-031, 1(1), 38.1 mm SL, NTM S.11371-084, 5(5), 27.0-51.8 mm SL, NTM S.11375-012, 2(2), 32.0-33.9 mm SL; Timor Sea, Scott Reef, South Reef lagoon, AMS I.21318-006, 1(1), 38.2 mm SL. PAPUA NEW GUINEA: New Britain, near Tawui, BMNH 1983.3.25.165, 1(1), 57.7 mm SL. SOLOMON IDS: Russell Ids, Laumuan Id, BPBM 10719, 1(1), 40.2 mm SL; Malaita Id, Alite Reef, BPBM 15625, 1(1), 50.2 mm SL; Florida Id, near Tanavulu Point, AMS I.17499-026, 1(1), 47.2 mm SL, BPBM 15653, 2(2), 22.8-44.2 mm SL; Florida Id, Kovuhika Id, AMS I.17498-021, 1(1), 57.8 mm SL; Guadalcanal, 12 km W of Honiara, ROM 42362, 1(1), 30.2 mm SL.

Pseudochromis caudalis Boulenger
Stripe-tailed Dottyback
Figure 33; Plates 5B-C

Pseudochromis caudalis Boulenger, 1898: 134 (type locality: Karachi, Pakistan); Lubbock, 1975: 126, pl. 3, fig. c (description; distribution; synonymy with *P. spencei* Fowler and *P. ranjhai* Klausewitz); Lubbock, 1976: 169 (key); Hoover, 1993: 11 (Khor Fakkan); Gill & Mee, 1993: 54, fig. 2 (habitat and distribution; colour fig.); Gill & Randall, 1994: 16 (key); Randall, 1995: 141, fig. 332 (description; colour fig.; distribution); Debelius, 1998: 70 (colour fig.; habitat and distribution).

Pseudochromis spencei Fowler, 1929: 112, pl. 1 (type locality: Back Bay, Bombay, India); Böhlke, 1984: 149 (list).

Pseudochromis (Klunzingerina) spencei; Fowler, 1931b: 34 (compilation).

Pseudochromis (Pseudochromis) caudalis; Fowler, 1931b: 40 (compilation).

Pseudochromis ranjhai Klausewitz, 1961: 427, fig. 1 (type locality: Karachi, Pakistan); Klausewitz, 1968: 449 (key).

DIAGNOSIS: A species of *Pseudochromis* with the following combination of characters: segmented dorsal-fin rays 28-29; segmented anal-fin rays 17-19, usually 17-18; scales in lateral series 45-52, usually 47-50; anterior lateral-line scales 36-44; and dark grey to dark greyish brown (bright blue in life) spot on anterior of opercle behind upper edge of preopercle.

DESCRIPTION (based on 29 specimens, 22.4-83.9 mm SL): dorsal-fin rays III,28-29, last 7-29 segmented rays branched (all or all but first branched in specimens larger than 35 mm SL); anal-fin rays III,17-19, last 4-19 segmented rays branched (all or all but first branched in specimens larger than 35 mm SL); pectoral-fin rays 18-20; upper procurrent caudal-fin rays 7-8; lower procurrent caudal-fin rays 7-8; total caudal-fin rays 31-33; scales in lateral series 45-52; anterior lateral-line scales 36-44; anterior lateral line terminating beneath segmented dorsal-fin ray 20-25; posterior lateral-line scales 7-16 + 0-3; scales between lateral lines 3-5; horizontal scale rows above anal-fin origin 15-17 + 1 + 3-4 = 19-22; circumpeduncular scales 20-23; predorsal scales 18-25; scales behind eye 3-4; scales to preopercular angle 4-6; gill rakers 4-6 + 10-13 = 15-18; pseudobranch filaments 8-13; circumorbital pores 22-118; preopercular pores 14-56; dentary pores 4-6; posterior interorbital pores 1-10.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of mid AIO pores to anterior AIO pores; opercle with 3-5, usually relatively well-developed serrations; teeth of outer ceratobranchial-1 gill rakers usually either weakly developed or with well-developed teeth confined to tips of rakers, although sometimes with well-developed teeth running most of length of upper few rakers, rarely with moderate to well-developed teeth running most of length of all rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1 + 1*/1 or S/S/S + 3/1 + 1/1/1 + 1/1/1/1 + 1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1 + 1*/1; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray usually longest, although sometimes subequal to third; caudal fin rounded with truncate posterior margin becoming emarginate in specimens larger than about 30 mm SL, sometimes with only upper lobe strongly produced; vertebrae 10 + 16; epineurals 15-17; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 3-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-

less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 18 specimens, 30.8-83.9 mm SL): head length 21.0-26.9; orbit diameter 6.7-10.7; snout length 5.6-6.3; fleshy interorbital width 4.0-4.8; bony interorbital width 2.4-3.1; body width 9.8-12.3; snout tip to posterior tip of retroarticular bone 12.1-15.3; predorsal length 29.2-34.4; prepelvic length 29.2-34.4; posterior tip of retroarticular bone to pelvic-fin origin 17.1-20.5; dorsal-fin origin to pelvic-fin origin 24.7-28.1; dorsal-fin origin to middle dorsal-fin ray 33.0-37.3; dorsal-fin origin to anal-fin origin 37.0-42.9; pelvic-fin origin to anal-fin origin 23.8-34.9; middle dorsal-fin ray to dorsal-fin termination 25.0-28.6; middle dorsal-fin ray to anal-fin origin 21.8-26.6; anal-fin origin to dorsal-fin termination 32.1-36.8; anal-fin base length 26.2-31.9; dorsal-fin termination to anal-fin termination 12.7-16.1; dorsal-fin termination to caudal peduncle dorsal edge 9.9-13.5; dorsal-fin termination to caudal peduncle ventral edge 15.2-19.3; anal-fin termination to caudal peduncle dorsal edge 17.1-20.1; anal-fin termination to caudal peduncle ventral edge 10.9-13.5; first dorsal-fin spine 1.6-2.9; second dorsal-fin spine 3.9-6.8; third dorsal-fin spine 6.3-10.7; first segmented dorsal-fin ray 9.3-12.3; fourth last segmented dorsal-fin ray 13.1-16.3; first anal-fin spine 1.9-3.0; second anal-fin spine 4.8-7.5; third anal-fin spine 4.6-8.1; first segmented anal-fin ray 7.3-9.7; fourth last segmented anal-fin ray 11.2-13.4; third pectoral-fin ray 11.8-14.6; pelvic-fin spine 6.4-10.4; second segmented pelvic-fin ray 14.7-18.5; caudal-fin length 20.5-24.0.

Live coloration (based on Lubbock, 1975, photographs of specimens from India and Oman, and notes taken from a captive specimen; Plates 5B-C): head and body pale yellowish to orangish brown, darker dorsally; edge of opercle behind upper part of preopercle with bright blue oval spot, this edged posteriorly with dark grey to black; lower part of head with several horizontal rows of pale blue spots and streaks; ventroposterior rim of orbit pale blue; broad dark brown stripe extending from snout or edge of upper lip to eye; iris bright red to brown with bright green to blue oblique line above and below pupil; scales of nape and dorsal part of body each with dark blue to dark purple basal spot, these much paler and obliquely elongate on scales of lower part of body (spots indistinct or absent in small specimens); dorsal fin yellowish to reddish brown, becoming olive basally, with three to five rows of elongate dark blue to purple spots, these curving proximally posteriorly to form broken oblique lines; distal margin of dorsal fin narrowly bright blue; anal fin pinkish hyaline, becoming pale yellow to grey basally, with three to five rows of pale blue to purple spots and blue distal margin; caudal fin light brown to yellow, becoming yellowish orange dorsally and ventrally, and greyish hyaline posteriorly, with horizontal dark grey to black stripe near upper border and one near lower border of fin, these absent or inconspicuous in small specimens; pectoral fins hyaline to pinkish hyaline, sometimes dusky grey basally on upper part of fin; pelvic fins pale yellow to hyaline.

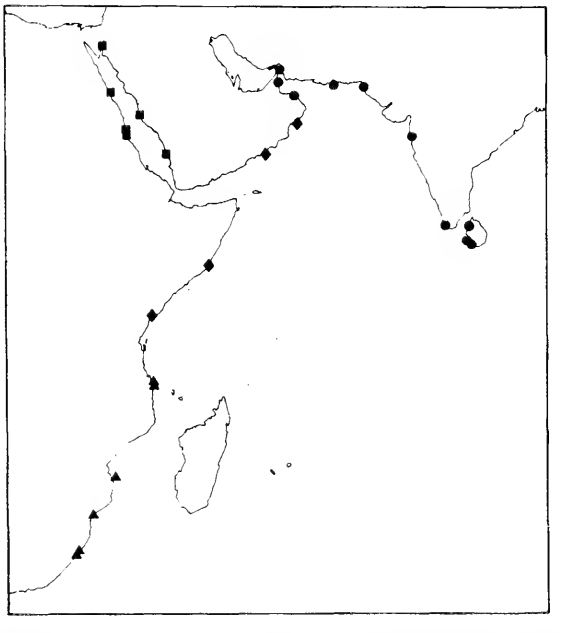

Figure 33. Distributional records for *Pseudochromis caudalis* (closed circles), *P. dixurus* (squares), *P. leucorhynchus* (diamonds) and *P. natalensis* (triangles).

Preserved coloration: pattern similar to live coloration, head and body becoming brown, paler ventrally; dark edged bright blue spot on opercle becoming dark grey to dark greyish brown; dark brown stripe in front of eye remains; pale blue spots on head becoming obscure; dark blue to dark purple spots on scales of nape and body becoming dark brown to dark greyish brown; dorsal and anal fins becoming dusky hyaline, blue to purple spots becoming pale grey; caudal fin becoming brown basally and dusky hyaline distally, dorsal and ventral dark grey to black stripes remaining (stripes usually absent in specimens smaller than about 50 mm SL), yellowish orange area outside stripes becoming pale grey to white; pectoral fins hyaline; pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis caudalis* is known only from the Straits of Hormuz and Gulf of Oman east to Pakistan, the west coast of India, and Sri Lanka (Figure 33). It has been observed (Lubbock, 1975: 127; Gill & Mee, 1993: 55) and collected around rocks and coral rubble at depths ranging to 30 m. Based on museum collections, this species appears to be common in tidal pools.

COMPARISONS: *Pseudochromis caudalis* is relatively distinctive within the subfamily in having the following combination of characters: segmented dorsal-fin rays 28-29; segmented anal-fin rays 17-19 (usually 17-18); scales in lateral series 45-52; anterior lateral-line scales 36-44; and a large dark grey to dark greyish brown (bright blue in life) spot on anterior part of opercle behind upper part of preopercle. The only other pseudochromines with similar character combinations are *P. mooii* from Komodo Id, Indonesia, *P. natalensis* from south-eastern Africa, *P. omanensis* from southern and cenral Oman and *P. persicus* from the Persian Gulf to Pakistan. *Pseudochromis mooii* differs from *P. caudalis* in lacking the dark spot on the anterior part of the opercle. *Pseudochromis natalensis* differs from *P. caudalis* in tending to have fewer segmented dorsal-fin rays (26-28, usually 27 versus 28-29), fewer scales in lateral series (41-50, usually 44-47, versus 45-52, usually 47-50) and fewer dentary pores (4-5, rarely 5 versus

4-6, usually 5-6 in specimens larger than about 50 mm SL). *Pseudochromis omanensis* and *P. persicus* differ from *P. caudalis* in tending to have higher (although overlapping) numbers of segmented dorsal-fin rays (29-31, usually 30 versus 28-29), anal-fin rays (19-21 versus 17-19, usually 17-18), scales in lateral series (51-67, usually 53 or more, versus 45-52, usually 47-50), and anterior lateral line scales (42-60, usually 46-56, versus 36-44). Large (greater than about 50 mm SL) specimens of *P. caudalis* are readily distinguished from *P. mooii, P. natalensis, P. omanensis* and *P. persicus* in having prominent dark grey to black stripes on the caudal fin.

REMARKS: *Pseudochromis caudalis* is a relatively large species; the largest specimen examined measured 83.9 mm SL. Colour figures of this species are provided by Lubbock (1975), Hoover (1993, p. 11 - as "new *Pseudochromis* species, as yet unnamed" - apparently in confusion with *P. omanensis*), Gill & Mee (1993), Randall (1995) and Debelius (1998).

ETYMOLOGY: The specific epithet is derived from the Latin *cauda*, tail, and *alis*, pertaining to, with reference to the distinctively marked caudal fin.

MATERIAL EXAMINED: OMAN: Strait of Hormuz, USNM 324634, 2(1, 39.8 mm SL), 35.5-39.8 mm SL; Strait of Hormuz, S end of Jazirat al Ghanam, USNM 324633, 1(1), 46.1 mm SL. PAKISTAN: Arabian Sea, W end of Astola Id, USNM 212273, 36(15, 32.6-64.8 mm SL; 3 specimens, 52.9-60.1 mm SL, cleared and stained), 32.6-64.8 mm SL; Goth Jafar, CAS 35588, 2(0), 46.9-52.0 mm SL; Karachi, BMNH 1898.6.29.75, 1(1), 81.4 mm SL (holotype of *P. caudalis* Boulenger), SMF 5426, 1(1), 56.4 mm SL (holotype of *P. ranjhai* Klausewitz); Karachi, Boleji, BMNH 1973.12.20.8-14, 7(0), 51.7-77.8 mm SL, BPBM 16408, 1(0), 65.8 mm SL, USNM 211760, 1(0), 61.4 mm SL; Karachi, Cape Monze, BMNH 1973.12.20.15, 1(0), 37.4 mm SL. INDIA: Bombay, Back Bay, ANSP 53937, 1(1), 40.8 mm SL (holotype of *P. spencei* Fowler); Bombay, Ratnagiri, BMNH 1960.8.29.1, 1(0), 45.4 mm SL; Kerala, Vizhinjam, off Mulloor Point, BPBM 27710, 6(6), 22.4-83.9 mm SL. SRI LANKA (CEYLON): reef off Negombo, BPBM 18762, 1(0), 74.4 mm SL; off Akralla, USNM 290106, 1(0); Hikkaduwa, ANSP 158225, 1(1), 30.8 mm SL, ANSP 18226, 2(0), 19.0-35.0 mm SL, USNM 290190, 1(0), USNM 290191, 1(0); Weligma, ANSP 158224, 2(2), 30.0-57.3 mm SL, USNM 290305, 2(0); Trincomalee, Lively Rocks, BPBM 18840, 1(0), 15.4 mm SL.

Pseudochromis coccinicauda (Tickell in Day)

Yellow-breasted Dottyback

Figure 34; Plates 5D-E

Malacocanthus coccinicauda Tickell in Day, 1888: 791 (type locality: Saddle Id, Arrakan, Burma); Myers, 1951: 26; Whitehead & Talwar, 1976: 113.

Malacocanthus bicolour Tickell in Day, 1888: 791 (type locality: Saddle Id, Arrakan, Burma); Myers, 1951: 26; Whitehead & Talwar, 1976: 113.

Pseudochromis tapeinosoma [*non* Bleeker, 1853a]; Jones & Kumaran, 1980: 232, fig. 196 (description; sexual dimorphism; Laccadive Ids); Lubbock, 1976: 167 (Sri Lanka).

Pseudochromis cyanotaenia [*non* Bleeker, 1857]; Baensch & Debelius, 1992: 968 (colour figs).

Pseudochromis coccinicauda; Gill, 1993: 44 (sexual dimorphism; distribution); Fosså & Nilsen, 1993: 128 (colour fig.); Randall & Anderson, 1993: 15, pl.3d (Maldives; colour fig.); Gill & Allen, 1996: 36, tab.1, fig. 2 (comparison; colour fig.); Gill, 1999b: 2564 (key).

DIAGNOSIS: *Pseudochromis coccinicauda* differs from congeners in having the following combination of characters: segmented dorsal-fin rays 22-23, rarely 23; segmented anal-fin rays 12-13, rarely 12; anal-fin spines slender and weakly pungent to flexible, the second spine less stout than the third; scales in lateral series 33-40, usually 35-38; anterior lateral-line scales 28-34, usually 30-32; and scales below anterior lateral-line 11-14, usually 12-13.

DESCRIPTION (based on 30 specimens, 23.4-44.8 mm SL): dorsal-fin rays III,22-23, all or all but first segmented rays branched; anal-fin rays III,12-13, all or all but first segmented rays branched; pectoral-fin rays 17-19; upper procurrent caudal-fin rays 6-8; lower procurrent caudal-fin rays 6-8; total caudal-fin rays 30-33; scales in lateral series 33-40; anterior lateral-line scales 28-34; anterior lateral line terminating beneath segmented dorsal-fin ray 17-22; posterior lateral-line scales 7-11 + 0-2; scales between lateral lines 2-4; horizontal scale rows above anal-fin origin 11-14 + 1 + 2-3 = 14-18; circumpeduncular scales 16-17; predorsal scales 12-17; scales behind eye 2-3; scales to preopercular angle 3-4; gill rakers 3-6 + 10-11 = 13-16; pseudobranch filaments 7-10; circumorbital pores 20-84; preopercular pores 12-36; dentary pores 4-5; posterior interorbital pores 1-2.

Lower lip varying from incomplete with weak symphyseal interruption to complete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from mid AIO pores to anterior AIO pores; opercle with 3-6 small, inconspicuous serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or with well-developed teeth confined to raker tips; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1/1/1 + 1*/1/1/1; dorsal-fin spines slender and weakly pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1/1/1 + 1; anal-fin spines slender and weakly pungent to flexible, second spine less stout than third; pelvic-fin spine slender and weakly pungent to flexible; second or third segmented pelvic-fin ray longest; caudal fin rounded, often with posterior margin almost truncate; vertebrae 10 + 16; epineurals 15-17; epurals 2.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 5-7 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed

and edentate.

As percentage of SL (based on 15 specimens, 26.2-44.8 mm SL): head length 23.3-25.6; orbit diameter 7.7-9.6; snout length 4.5-6.0; fleshy interorbital width 3.8-5.1; bony interorbital width 2.4-3.6; body width 11.8-13.5; snout tip to posterior tip of retroarticular bone 12.1-13.7; predorsal length 28.7-34.0; prepelvic length 28.2-32.1; posterior tip of retroarticular bone to pelvic-fin origin 17.3-19.7; dorsal-fin origin to pelvic-fin origin 24.4-27.6; dorsal-fin origin to middle dorsal-fin ray 27.9-32.8; dorsal-fin origin to anal-fin origin 37.7-41.6; pelvic-fin origin to anal-fin origin 27.1-33.2; middle dorsal-fin ray to dorsal-fin termination 24.3-26.9; middle dorsal-fin ray to anal-fin origin 22.9-27.9; anal-fin origin to dorsal-fin termination 31.7-36.7; anal-fin base length 23.0-27.6; dorsal-fin termination to anal-fin termination 14.5-17.9; dorsal-fin termination to caudal peduncle dorsal edge 13.2-15.5; dorsal-fin termination to caudal peduncle ventral edge 19.9-23.5; anal-fin termination to caudal peduncle dorsal edge 22.3-24.6; anal-fin termination to caudal peduncle ventral edge 16.0-17.7; first dorsal-fin spine 1.2-2.3; second dorsal-fin spine 3.5-5.7; third dorsal-fin spine 5.9-8.4; first segmented dorsal-fin ray 10.2-13.0; fourth last segmented dorsal-fin ray 13.9-17.9; first anal-fin spine 0.7-2.3; second anal-fin spine 3.4-6.2; third anal-fin spine 5.5-8.5; first segmented anal-fin ray 9.6-11.8; fourth last segmented anal-fin ray 13.4-16.8; third pectoral-fin ray 13.4-17.0; pelvic-fin spine 6.9-9.9; second segmented pelvic-fin ray 26.2-21.8; caudal-fin length 21.7-26.3

Live coloration: Females (based on a photograph of a specimen from the Maldive Ids and photograph in Baensch & Debelius, 1992; Plate 5D): head and body brown to greenish grey, paler ventrally, becoming reddish to orangish brown on head and on caudal peduncle; iris pale greyish yellow with blue suboval ring around pupil; dorsal fin brown, becoming pinkish hyaline distally and reddish brown posteriorly; anal fin pale pink basally, becoming pinkish to bluish hyaline distally; caudal fin bright orange-red, distal margin of fin broadly bluish hyaline to hyaline; pectoral fins pinkish hyaline; pelvic fins pale pink. Males (based on photographs of specimens from the Maldive Ids and Jakarta, Indonesia, and photograph in Baensch and Debelius, 1992; Plate 5E): body and dorsal contour of head dark bluish grey to black, with scattered blue flecks; lips and lower part of head below level of midorbit yellowish grey to yellowish brown; iris reddish grey to yellow or bright red, with blue suboval ring around pupil; breast and anterior part of body below anterior lateral line and in front of middle of anal fin abruptly yellowish brown to bright yellow; dorsal contour of caudal peduncle and body behind dorsal-fin origin with scattered small pale to bright blue spots; anterior lateral scales sometimes bright blue; sides of caudal peduncle and posterior part of body within dark bluish grey to black region with series of bright blue bars, these strongest anteriorly, sometimes extending anteriorly onto yellowish brown to bright yellow abdominal region; scales of lower part of dark region on caudal peduncle and posterior part of body each with mauve to pinkish grey central spot; basal half of dorsal fin dark bluish to black, remainder of fin abruptly pale blue to greyish hyaline with blue distal margin; anal fin pale pinkish grey to pale grey basally, becoming greyish hyaline to hyaline distally, with blue distal margin; basal two-thirds of caudal fin dark bluish grey to black, remainder of fin abruptly pale blue to greyish hyaline; pectoral and pelvic fins yellowish hyaline.

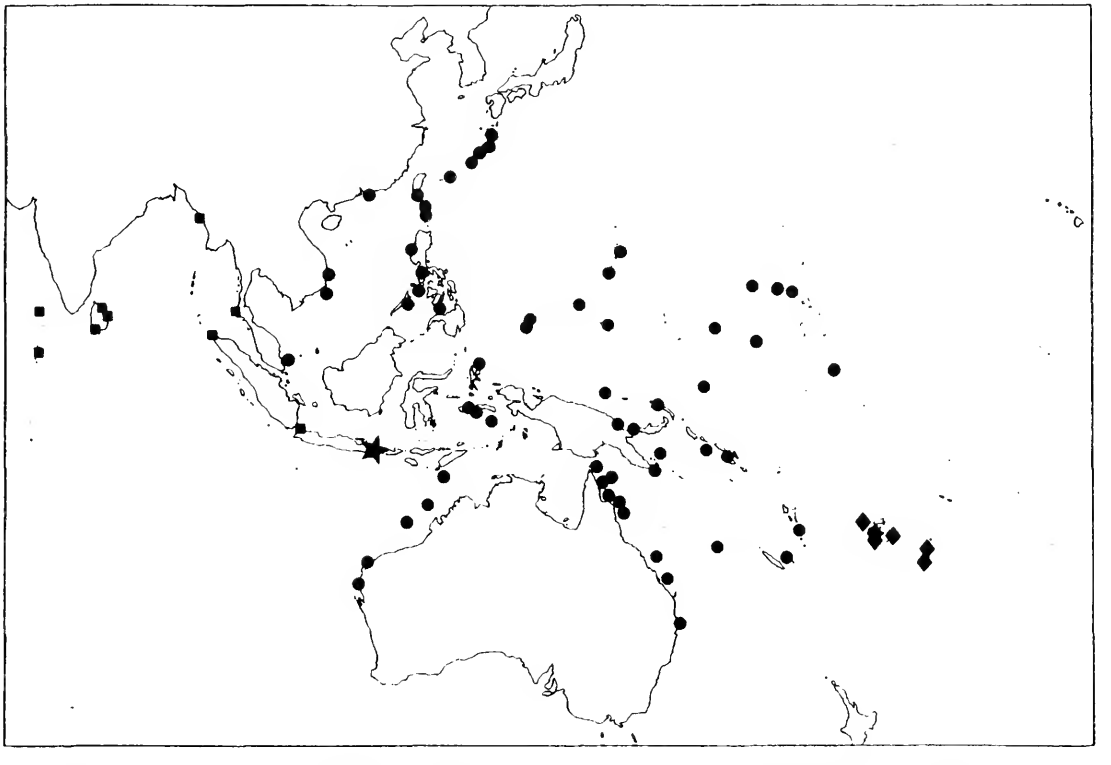

Figure 34. Distributional records for *Pseudochromis coccinicauda* (squares), *P. cyanotaenia* (closed circles), *P. coccinicauda* + *P. cyanotaenia* (star) and *P. melanurus* (diamonds).

Preserved coloration: Juveniles and females: pattern similar to live coloration, head and body becoming pale brown to brown; dorsal fin becoming brownish hyaline to hyaline; anal fin brownish hyaline to hyaline, usually darker basally; caudal fin pale brown to greyish brown basally, becoming brownish hyaline to hyaline posteriorly; pectoral fins hyaline; pelvic fins hyaline to pale brown. Males: pattern similar to live coloration, dark bluish grey to black areas on head, body and fins becoming dark brown to black; yellowish grey or yellowish brown to bright yellow areas on head and body becoming pale brown to brown; bright blue bars on body rarely remain, becoming pale grey; pinkish grey to mauve spots on body becoming pale grey to pale brown; pale areas on fins becoming pale brown to hyaline; pectoral fins hyaline; pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: This species is known only from the central and eastern Indian Oceans, from the Maldive and Laccadive Ids east to Bali, Indonesia (Figure 34). It has been collected mainly from surge areas on rock and coral reefs at depths ranging from 0.5 to 9 m.

COMPARISONS: *Pseudochromis coccinicauda* closely resembles *P. cyanotaenia, P. melanurus, P. tapeinosoma* and *P. viridis* in having low segmented dorsal- and anal-ray counts (modally 22 and 13, respectively), 16 circumpeduncular scales, and only two epurals (three in all other pseudochromines except *Assiculoides desmonotus*). Gill & Allen (1996) hypothesised that the five species form a monophyletic subgroup of the *P. tapeinosoma* complex (Gill & Winterbottom, 1993) and termed it the *P. tapeinosoma* group. Males of the five species are readily distinguished by live coloration: *P. coccinicauda* is bluish grey to black, with the lower part of the head and body in front of the middle of the anal fin yellowish brown to bright yellow, and scattered blue spots and/or bars on the caudal peduncle; *P. cyanotaenia* is dark grey to black, with a bright yellow line along the upper part of the body (along the scale row immediately beneath the anterior lateral line), yellow on the lower part of the head and anterior part of the breast, and bright blue spots and/or bars on the caudal peduncle; *P. melanurus* is dark grey to black, with the lower part of the head and the lower part of the body in front of the anal fin yellowish brown; *P. tapeinosoma* is yellowish brown with the upper part of the head dark grey to black, scattered blue or pale grey spots on the posterior part of the body and caudal peduncle, a bright yellow dorsal fin with a black stripe along the basal or middle part of the fin, and a bright yellow caudal fin with a black horseshoe-shaped marking; and *P. viridis* is more-or-less uniformly bright yellowish olive.

Juvenile/female live coloration differs very little among the *P. tapeinosoma*-group species, being more-or-less uniformly greyish brown to brown, paler ventrally, usually with the caudal peduncle and tail yellowish brown to bright red. (The live coloration of female *P. viridis* is unknown, but, based on similarities in preserved coloration to other species in the clade, is unlikely to differ significantly from the other species.) As a consequence females of the five species have been previously confused as a single species under the name *P. tapeinosoma*. However, *P. tapeinosoma* females, at least when freshly preserved, may be separated from the other species in having a darker spot covering the posttemporal pores (dark grey to black versus grey to dusky grey).

As noted by Gill & Allen (1996: tab. 1), the five species also differ slightly in several meristic characters (see Appendix 1): scales in lateral series (33-40, usually 35-38 in *P. coccinicauda*, 30-37, usually 31-35 in *P. cyanotaenia*, 29-35, usually 30-33 in *P. melanurus*, 27-34, usually 29-32 in *P. tapeinosoma*, and 33-37 in *P. viridis*); anterior lateral-line scales (28-34, usually 30-32 in *P. coccinicauda*, 23-31, usually 25-29 in *P. cyanotaenia*, 23-28, usually 24-27 in *P. melanurus*, 20-27, usually 23-25 in *P. tapeinosoma*, and 26-30 in *P. viridis*); horizontal scale rows below anterior lateral line (11-14, usually 12-13 in *P. coccinicauda*, 9-13, usually 10-12 in *P. cyanotaenia*, 10-12 in *P. melanurus*, 10-12, usually 10-11 in *P. tapeinosoma*, and 11-12 in *P. viridis*); and predorsal scales (12-17, usually 14-15 in *P. coccinicauda*, 11-19, usually 12-16 in *P. cyanotaenia*, 12-16, usually 13-14 in *P. melanurus*, 10-15, usually 11-13 in *P. tapeinosoma*, and 13-15 in *P. viridis*). Although there is considerable overlap in each of these characters, and none distinguishes *P. cyanotaenia* from *P. viridis*, they can be useful in identifying female/juveniles specimens or faded museum specimens of some of the species. Geographic origin is also a useful means of identifying species within the group. With the exception of *P. cyanotaenia* and *P. tapeinosoma* (which broadly overlap throughout the Ryukyu Ids, Philippines, Indonesia, Papua New Guinea and the Solomon Ids), species in the group are for the most part allopatrically distributed. Areas of sympatry include the eastern Andaman Sea and western Indonesia (*P. coccinicauda* and *P. tapeinosoma*), and Bali, Indonesia (*P. coccinicauda, P. cyanotaenia* and *P. tapeinosoma*).

REMARKS: *Pseudochromis coccinicauda* is a small species; the largest specimen examined measured 44.8 mm SL. The sexual dimorphism described above is based on a superficial examination of gonads of preserved specimens. Several of the male specimens examined had ovarian tissue ventrad to the testes. Considering that all sexable small specimens were females and that juveniles had similar preserved colourations to females, this probably indicates that this species is a protogynous hermaphrodite. Baensch & Debelius (1992) provide live colour illustrations of both sexes (misidentified as *P. cyanotaenia*), Randall & Anderson (1993) and Gill & Allen (1996) illustrate males, and Fosså & Nilsen (1993) illustrate a female.

Day (1888) published S.R. Tickell's manuscript descriptions of "two varieties of a species" of *Pseudochromis* from Burma, *Malacocanthus coccinicauda* and *M. bicolour*. These descriptions are clearly based on the female and male colourations, respectively, of the present species. Although *Malacocanthus* is not an available name (see *Remarks* for *Pseudochromis*), this does not affect the availability of either *coccinicauda* or *bicolour* (International Commission on Zoological Nomenclature, 1999: Article 11.9.3.1). Myers (1951), Whitehead & Talwar (1976) and Eschmeyer (1990: 647) interpreted Day's (1888) original usage of *M. coccinicauda* and *M. bicolour* as names in synonymy with *Pseudochromis fuscus*. If this was the case, in order to become available, the two names would have had to have been treated as available

names and used for a taxon or as senior homonyms prior to 1961 (International Commission on Zoological Nomenclature, 1999: Article 11.6). However, Day did not indicate that *M. coccinicauda* and *M. bicolour* were synonyms of *P. fuscus*, only that *Malacocanthus* was a synonym of *Pseudochromis*. As first revisor, I here place *M. bicolour* in the synonymy of *M. coccinicauda* in keeping with the position priority of the latter name. This action may not be necessary if an argument was made that Day had intended *M. bicolour* to be a variety of *M. coccinicauda* (International Commission on Zoological Nomenclature, 1999: Article 45.5). In support of the latter interpretation, the index to Day's work lists *M. coccinicauda* but not *M. bicolour*.

Pseudochromis coccinicauda has previously been confused with *P. cyanotaenia* under the name *P. tapeinosoma*. *Pseudochromis coccinicauda* has been collected in the same ichthyocide station as *P. cyanotaenia* in Bali, Indonesia.

ETYMOLOGY: The specific epithet is from the Latin *coccineus*, berry red, and *cauda*, tail, and alludes to the bright caudal fin of the female. The termination of the name is feminine. However, as the name was originally associated with *Malacocanthus*, which has a masculine termination, it is here treated as a noun in apposition.

MATERIAL EXAMINED: MALDIVE IDS: Malé Atoll, E end of Malé Id, BPBM 33018, 4(4), 34.8-39.4 mm SL; Malé Atoll, Funida Islet, CAS 58697, 1(1), 37.3 mm SL. SRI LANKA: Trincomalee, USNM 212274, 8(6, 28.0-43.3 mm SL), 18.4-43.3 mm SL, USNM 212275, 5(4, 23.4-39.8 mm SL), 23.4-39.8 mm SL, USNM 290102, 1(0); Batticaloa district, Palamunai, USNM 290774, 1(0); Hikkaduwa, ANSP 158221, 4(0), 23.8-44.0 mm SL, USNM 290642, 1(0); Galle Harbour, USNM 290423, 1(0); Weligama, ANSP 158222, 6(3, 26.2-38.0 mm SL), 20.0-38.0 mm SL, USNM 290647, 2(0). THAILAND: Andaman Sea, Similan Ids, Ko Miang, BPBM 22858, 1(1), 41.5 mm SL. INDONESIA: Sumatera, Pulo Boenta, USNM 290115, 2(2), 38.8-39.9 mm SL, USNM 290606, 1(1), 44.8 mm SL, USNM 290742, 1(1), 41.2 mm SL; Bali, Sanur Beach, NTM S.11081-038, 17(7, 23.9-41.5 mm SL), 20.0-41.5 mm SL.

***Pseudochromis colei* Herre**
False Bandit Dottyback
Figures 35-36

Pseudochromis colei Herre, 1933a: 18 (type locality: Culion, Philippines); Herre, 1934: 45 (list); Roxas & Martin, 1937: 123 (list); Herre, 1953: 372 (list); Böhlke, 1953: 70 (list); Gill & Randall, 1992: 44 (comparison); Gill, 1999b: 2563 (key).

DIAGNOSIS: A species of *Pseudochromis* with the following combination of characters: palatine tooth patches inserted medially behind vomerine tooth patch; circumpeduncular scales 16; and upper part of body with dark longitudinal stripe extending from middle of upper lip through eye above anterior lateral line to mid-upper caudal-fin rays.

DESCRIPTION (based on one specimen, 59.6 mm SL): dorsal-fin rays III,24, last 19 segmented rays branched; anal-fin rays III,15, all segmented rays branched; pectoral-fin rays 18; upper procurrent caudal-fin rays 6; lower procurrent caudal-fin rays 6; total caudal-fin rays 29; scales in lateral series 33-34; anterior lateral-line scales 28-29; anterior lateral line terminating beneath segmented dorsal-fin ray 20; posterior lateral-line scales 8-10 + ? (caudal-fin scales damaged); scales between lateral lines 3; horizontal scale rows above anal-fin origin 12 + 1 + 2-3 = 15-16; circumpeduncular scales 16; predorsal scales 16; scales behind eye 2; scales to preopercular angle 5; gill rakers 6-7 + 12-13 = 19; pseudobranch filaments 12; circumorbital pores 25-26; preopercular pores 14-16; dentary pores 4; posterior interorbital pores 1.

Lower lip incomplete; scales absent from dorsal and anal fin bases; predorsal scales extending anteriorly to anterior AIO pores; opercle with 4-5 relatively large serrations; teeth of outer ceratobranchial-1 gill rakers well-developed, arranged in two rows running most of length of rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1/1 + 1; dorsal-fin spines pungent and stout; anterior anal-fin pterygiophore formula 3/1/1 + 1/1/1 + 1/1/1 + 1; anal-fin spines pungent and stout, second spine stouter than third; pelvic-fin spine pungent and stout; second segmented pelvic-fin ray longest; caudal fin "trifurcate" with "filamentous prolongations in upper and lower half" (after Herre, 1933a: 18); vertebrae 10 + 16; epineurals 13; epurals 3.

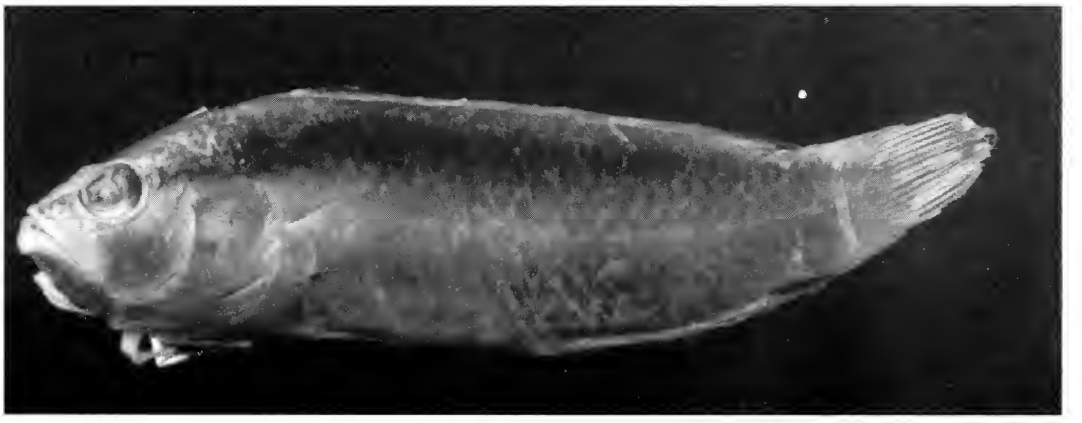

Figure 35. *Pseudochromis colei*, CAS-SU 30974, 59.6 mm SL, holotype, Culion, Calamian Group, Philippines. (Photo by P. Hurst)

Upper jaw with 2 pairs of curved, enlarged caniniform teeth, subequal in size, and about 3-4 (at symphysis) to 2-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1 pair of curved, caniniform teeth, and about 3 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-2 irregular rows of small conical teeth arranged in elongate patch, anterior tip of patch directed medially behind posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL: head length 22.5; orbit diameter 8.1; snout length 6.7; fleshy interorbital width 5.5; bony interorbital width 3.7; body width 12.9; snout tip to posterior tip of retroarticular bone 15.8; predorsal length 35.1; prepelvic length 36.9; posterior tip of retroarticular bone to pelvic-fin origin 23.8; dorsal-fin origin to pelvic-fin origin 29.0; dorsal-fin origin to middle dorsal-fin ray 34.1; dorsal-fin origin to anal-fin origin 43.8; pelvic-fin origin to anal-fin origin 28.4; middle dorsal-fin ray to dorsal-fin termination 24.3; middle dorsal-fin ray to anal-fin origin 28.9; anal-fin origin to dorsal-fin termination 36.2; anal-fin base length 29.4; dorsal-fin termination to anal-fin termination 16.9; dorsal-fin termination to caudal peduncle dorsal edge 10.4; dorsal-fin termination to caudal peduncle ventral edge 18.1; anal-fin termination to caudal peduncle dorsal edge 21.1; anal-fin termination to caudal peduncle ventral edge 12.9; first dorsal-fin spine 3.5; second dorsal-fin spine 8.9; third dorsal-fin spine 11.4; first segmented dorsal-fin ray ? (damaged); fourth last segmented dorsal-fin ray ? (damaged); first anal-fin spine 2.7; second anal-fin spine 8.1; third anal-fin spine 9.9; first segmented anal-fin ray 12.9; fourth last segmented anal-fin ray 14.6; third pectoral-fin ray ? (damaged); pelvic-fin spine 11.7; second segmented pelvic-fin ray 20.6; caudal-fin length 24.0.

Live coloration: not known.

Preserved coloration: dorsal contour of head and body brown; dark brown stripe extending from middle of upper lip through eye and below anterior lateral line to mid-upper caudal-fin base; head and body below dark stripe pale brown; dorsal and anal fins pale brown to hyaline, each with brown marginal line [after Herre (1933a: 19); brown lines no longer discernable]; caudal fin pale brown to hyaline with dark body stripe extending onto mid-upper caudal-fin rays, stripe becoming indistinct posteriorly; pectoral and pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis colei* is known only from the holotype collected at Culion, Culion Id, in the Calamian Group, Philippines (Figure 36). No information on habitat was included either in the original description or on the registration label for the specimen. Eichler & Myers (1997) recently published habitat and distribution information for *P. colei*, but this is apparently based on a different species (see *Remarks* below).

COMPARISONS: This species closely resembles *P. perspicillatus* from the Philippines and Indonesia, *P. moorei* from the Philippines, *P. quinquedentatus* from northern Australia, *P. howsoni* from the North West Shelf of Australia and *P. steenei* from Indonesia in having medially-inserted palatine tooth patches (Figure 23A). Of these species, *P. colei* most closely resembles *P. perspicillatus* in having a dark

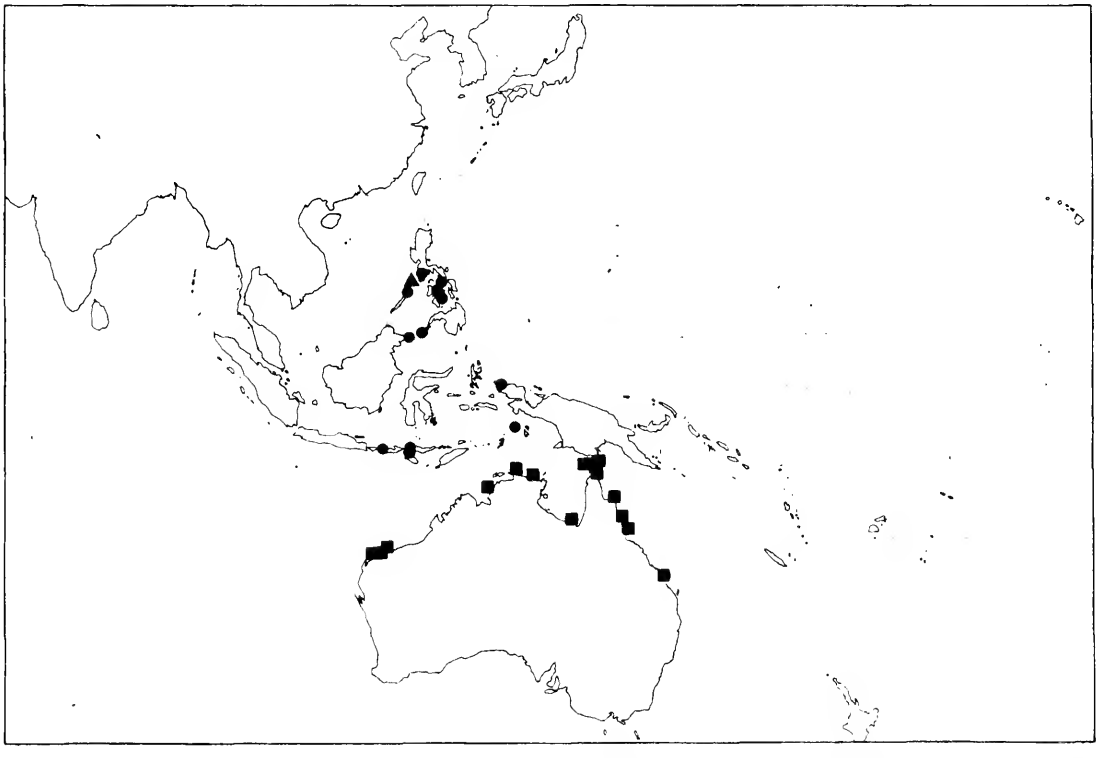

Figure 36. Distributional records for *Pseudochromis colei* + *P. perspicillatus* (triangle), *P. perspicillatus* (closed circles) and *P. quinquedentatus* (closed squares).

longitudinal stripe on the upper part of the body. The following characters distinguish *P. colei* from *P. perspicillatus*: 33-34 scales in lateral series (versus 38-42), 3 scales between lateral lines (versus 4-6), 16 circumpeduncular scales (versus 20-24), 12 + 1 + 2-3 = 15-16 horizontal scale rows above anal-fin origin (versus 14-18 + 1 + 3-4 = 18-23), 16 predorsal scales (versus 22-27), and dark stripe from behind eye continues below anterior lateral line to or towards mid-upper caudal-fin rays (versus crosses middle part of anterior lateral line to join a basal dark stripe on middle part of dorsal fin).

REMARKS: *Pseudochromis colei* is one of two pseudochromine species known only on the basis of holotypes from Culion; the other species is *Labracinus atrofasciatus*. It occurs sympatrically in Culion with the closely related *P. perspicillatus*. [*Pseudochromis perspicillatus* was recorded from Culion by Herre (1933a) as *P. sinuilineus*.]

Eichler & Myers (1997) recently published a photograph of a *Pseudochromis* (reproduced here in Plate 5F) from the E side of Borocay Id, Philippines, as *P. colei*. They also recorded the species from northern Indonesia; although not stated by them, the latter record was based on a photograph by R.M. Pyle of an individual at Tanjung Sipsipi, Halmahera. However, more careful examination of the photographs has shown that these identifications (which were provided by me) are in error. Although the photographed individuals closely resemble the holotype of *P. colei* in general morphology and in colour pattern, they differ in having much smaller scales (e.g., ca. 40-45 scales in lateral series versus 33-34 in *P. colei*). The Halmahera and Borocay Id individuals differs slightly from each other in live coloration and may prove to represent different species. Specimens are needed in order to assess their taxonomic status.

ETYMOLOGY: The specific epithet is for Dr Howard I. Cole, chemist of the leper colony at Culion at the time Herre made collections in the area.

MATERIAL EXAMINED: PHILIPPINES: Calamian Group, Culion Id, Culion, CAS-SU 30974, 1(1), 59.6 mm SL (holotype).

***Pseudochromis cometes* Gill & Randall**
Comet Dottyback
Figures 30, 37

Pseudochromis cometes Gill & Randall, 1998: 19, fig. 2 (type locality: E of Turo Liu Point, Komodo Id, Indonesia); Gill, 1999b: 2564 (key).

DIAGNOSIS: A species of *Pseudochromis* with the following combination of characters: dorsal-fin rays III,27; scales in lateral series 44; anterior lateral-line scales 32-34; and sides of body with 8-15 brown (black in life) narrow stripes.

DESCRIPTION (based on one specimen, 18.3 mm SL): dorsal-fin rays III,27, last 7 rays branched; anal-fin rays III,14; pectoral-fin rays 18; upper procurrent caudal-fin rays 6; lower procurrent caudal-fin rays 6; total caudal-fin rays 29; scales in lateral series 44; anterior lateral-line scales 32-34; anterior lateral line terminating beneath segmented dorsal-fin ray 17; posterior lateral-line scales 0 + 0; scales between lateral lines 4; horizontal scales above anal-fin origin 15 + 1 + 2 = 18; circumpeduncular scales 20; predorsal scales 20; scales behind eye 3; scales to preopercular angle 4; gill rakers 4 + 11 = 15; pseudobranch filaments 8; circumorbital pores 15-17; preopercular pores 10; dentary pores 4; posterior interorbital pores 1.

Lower lip incomplete; dorsal and anal fins without scale sheaths; predorsal scales extending anteriorly to PIO pores; opercle with 5 relatively large serrations; teeth of outer ceratobranchial-1 gill rakers weakly developed; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1 + 1/1/1/1/1 + 1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1/1 + 1/1/1 + 1/1; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray longest; caudal fin truncate; vertebrae 10 + 16; epineurals 13; epurals 3.

Upper jaw with 2 pairs of curved, enlarged caniniform teeth anteriorly, and 3-4 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 3 pairs of curved, enlarged caniniform teeth anteriorly, and 3 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on sides of jaw gradually increasing in size and becoming more curved and caniniform, then abruptly smaller

Figure 37. *Pseudochromis cometes*, BPBM 31545, 18.3 mm SL, holotype, Turo Liu Point, Komodo Island, Indonesia. (Photo by P. Crabb)

and conical on middle of jaw; vomer with 2 rows of small conical teeth, forming chevron; palatine with 1-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue short, moderately pointed and edentate.

Live coloration (based on field notes by J.E. Randall): head and anterior part of body bright orange-red, this shading posteriorly to olive on remainder of body; olive part of body with black stripes; caudal fin yellow.

Preserved coloration: head, breast and nape cream, remainder of body pale yellow to pale brown; scales of pale yellow to pale brown region each with brown stripe, these aligning along each horizontal scale row to form eight (posteriorly) to 15 (anteriorly) narrow stripes; basal third of dorsal and anal fins brown, remainder hyaline; caudal fin pale brown to brown basally, remainder hyaline; pectoral fins hyaline; pelvic fins pale brownish hyaline to hyaline.

HABITAT AND DISTRIBUTION: Known only on the basis of two individuals (one not collected) from off Turo Liu Point, Komodo, Indonesia (Figure 30). They were observed and collected among isolated coral and rock patches on a sloping sand and rubble bottom at a depth of 18 m.

COMPARISONS: The presence of eight to 15 dark stripes on the body distinguishes this species from most other pseudochromines. Similar dark body stripes are also found in *P. striatus* and *Labracinus* species and in some specimens of *P. dilectus* and *P. fuscus*. *Pseudochromis cometes* differs from *P. striatus* in having more scales in lateral series (44 versus 35-37), more circumpeduncular scales (20 versus 14-16), and more horizontal scale rows above the anal-fin origin (15 + 1 + 2 = 18 versus 9-10 + 1 + 1-2 = 11-13). It is readily distinguished from *Labracinus* species in having more dorsal-fin rays (III,27 versus II,24-26, usually II,25 for *Labracinus* species) and lower scale counts (scales in lateral series 44, anterior lateral-line scales 32-34 versus 52-74 and 43-67). It differs from *P. dilectus* in having fewer segmented dorsal- and anal-fin rays (27 and 14, respectively, versus 29-31 and 15-16 for *P. dilectus*), and a different anterior dorsal-fin pterygiophore formula (S/S/S + 3/1 + 1/1/1 + 1 versus S/S/S + 3/1 + 1/1 + 1/1). Although the meristic values for *P. cometes* are similar to those of *P. fuscus*, the structure of the dark stripes differs. Whereas in *P. cometes* the stripes are relatively even in width, in *P. fuscus* they are distinctly thickened at the base of each scale and are more usually present as closely aligned spots that are arranged in horizontal rows. Furthermore, *P. fuscus* has well-developed teeth running most of the length of the outer ceratobranchial-1 rakers whereas *P. cometes* lacks well-developed teeth. However, this may be associated with the small size of the *P. cometes* holotype; usually well-developed gill raker teeth do not develop in pseudochromines until a length of about 25 mmSL.

REMARKS: The holotype of *P. cometes* was collected by J.E. Randall in 1986. He also observed a second, larger (approximately 75 mm total length) individual at the same locality. He noted (pers. comm.) that it differed from the holotype in that the orange-red coloration extended farther posteriorly on the body. The holotype is too small and distorted to take accurate morphometric values; therefore, morphometric values are not provided.

ETYMOLOGY: The specific epithet is from the Latin for comet, and alludes to the live coloration of the species, with the bright orange red head representing the comet, and the black stripes its tail.

MATERIAL EXAMINED: INDONESIA: Komodo Id, E of Turo Liu Point, 08°36'S 119°31'06"E, BPBM 31545, 1(1), 18.3 mm SL (holotype).

***Pseudochromis cyanotaenia* Bleeker**
Blue-barred Dottyback
Figure 34; Plates 5G-H

Pseudochromis cyanotaenia Bleeker, 1857: 72 (type locality: Kajeli, Buro); Günther, 1860: 258 (compilation); Aoyagi, 1941c: 45, pl. 4, fig. 2 (Ryukyu Ids); Aoyagi, 1943: 105, pl. 31, fig. 2; Kamohara, 1954: 281 (Nakanoshima, Riu Kiu Ids); Whitley, 1964a: 42 (list); Kamohara & Yamakawa, 1965: 10 (Wadomari, Matsubara and Somachi, Ryu Kyu Ids); Burgess & Axelrod, 1974: fig. 265 (Taiwan); Masuda et al., 1975: 225, fig. 53-g (description; distribution); Shen, 1984: figs 291-4a and b (Taiwan; specific epithet misspelt "*cynotaenia*"); Hayashi, 1984: 139, pl. 126, fig. b (description; distribution); Debelius, 1984b: 426 (colour fig.); Birkholz, 1985: 529 (sexual dimorphism; captive breeding); Debelius, 1986: 20 (colour fig.); Burgess et al., 1988: pls 151 and 154 (colour figs); Myers, 1989: 113, 274, fig. 1a (description; distribution in part, excluding Fiji and central Indian Ocean); Gill, 1990b: 127 (description; distribution; sexual dimorphism; colour figs); Lowe & Russell, 1990: 8 (list; distribution); Michael, 1990b: 17 (colour figs; aquarium notes); Burgess et al., 1991: 205 (colour fig.); Kuiter, 1992: 42, fig. d (colour fig.); Gill, 1993: 44 (colour figs; sexual dimorphism; habitat and distribution); Fosså & Nilsen, 1993: 128 (colour fig.); Shao, 1994: 300, fig. 77-5 (description; colour fig.); Lieske & Myers, 1994: pl. 31, fig. 6 (colour fig.; habitat; distribution in part); Masuda & Kobayashi, 1994: 126, fig. 6 (colour fig.); Gill, 1995: 245 (discussion of identification of types); Gill & Allen, 1996: 36, tab. 1, figs 3 and 6 (comparison; colour figs); Gill, 1997: 127 (description; distribution; sexual dimorphism; colour figs); Allen, 1997: 94, pl. 28-15 (description; distribution in part; col. figs); Myers, 1999: 121, 297, pl. 48B (description; distribution; colour fig.); Gill, 1999b: 2573 (description; distribution; fig.).

Pseudochromis (Leptochromis) cyanotaenia; Bleeker, 1875: 21, pl. 1, fig. 1 (description; Buro, Amboina and Ceram); Bleeker, 1877: pl. 390, fig. 6.

Pseudochromis (Leptochromis) tapeinosoma [*non* Bleeker, 1853a]; McCulloch, 1926: 192, pl. 51 (description; sexual dimorphism; Great Barrier Reef, Torres Strait Ids and New Hebrides); Whitley, 1927: 14 (Michaelmas Cay, Queensland); Randall, 1955: 62 (description; Onotao and Tarawa, Gilbert Ids); Woodland & Slack-Smith, 1964: 30 (Heron Id, Great Barrier Reef).

Leptochromis tapeinosoma [*non Pseudochromis tapeinosoma*

Bleeker, 1853a]; McCulloch, 1929: 158 (list).

Pseudochromis (Assiculus) cyanotaenia; Fowler, 1931b: 24 (compilation).

Pseudochromis tapeinosoma [*non* Bleeker, 1853a]; Fowler, 1934: 412 (list); Fowler, 1949: 88 (list); Schultz, 1953: 390 (description; sexual dimorphism; Marshall and Mariana Ids); Whitley, 1964a: 42 (list); Russell, 1983: 44 (Capricorn Bunker Group, Great Barrier Reef); Allen, 1985: 2508, figs 149-150 (list, Western Australia; colour figs); Allen & Russell, 1986: 85 (list, Rowley Shoals and Scott Reef, Timor Sea); Randall & Randall, 1987: 298 (list, Marshall Ids); Burgess et al., 1988: pl. 151 (colour fig.); Allen & Swainston, 1988: 60, pl. 21, fig. 338 (sexual dimorphism); Paxton et al., 1989: 521 (list).

Pseudochromis kikaii Aoyagi, 1941c: 44, fig. 2 (type locality: Kikai I, Ryukyu Ids); Aoyagi, 1943: 104, fig. 26 (in part; Riu-Kiu Ids).

Pseudochromis (Assiculus) tapeinosoma [*non* Bleeker, 1953a]; Woodland & Slack-Smith, 1964: 30 (Heron Id, Great Barrier Reef).

Pseudochromis xanthochir [*non* Bleeker, 1855a]; Masuda et al., 1975: fig. 53-f (southern Japan); Hayashi, 1984: pl. 126, fig a (southern Japan).

Pseudoplesiops typus [*non* Bleeker, 1858]; Kami, 1975: 120 (Tanguisson, Guam); Shepard & Myers, 1982: 71 (list).

DIAGNOSIS: *Pseudochromis cyanotaenia* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 21-23, rarely 21 or 23; segmented anal-fin rays 12-14, rarely 12 or 14; anal-fin spines weakly pungent to flexible, the second spine varying from about as stout to less stout than the third; scales in lateral series 30-37, usually 31-35; anterior lateral-line scales 23-31, usually 25-29; and scales below anterior lateral line 9-13, usually 10-12. Males of the species are distinctive in having the following coloration: lower part of head and breast and scales of ascending portion of anterior lateral line and of scale row immediately below horizontal portion of anterior lateral line abruptly yellowish brown to bright yellow (pale brown to brown in preservative), the remainder of head and body dark grey to black (dark brown to black in preservative).

DESCRIPTION (based on 130 specimens, 21.2-50.3 mm SL): dorsal-fin rays III,21-23, all or all but first segmented rays branched; anal-fin rays III,12-14, all or all but first segmented rays branched; pectoral-fin rays 16-20; upper procurrent caudal-fin rays 6-8; lower procurrent caudal-fin rays 6-8; total caudal-fin rays 29-32; scales in lateral series 30-37; anterior lateral-line scales 23-31; anterior lateral line terminating beneath segmented dorsal-fin ray 15-21; posterior lateral-line scales 6-11 + 0-2; scales between lateral lines 2-4; horizontal scale rows above anal-fin origin 9-13 + 1 + 2-3 = 12-16; circumpeduncular scales 15-16; predorsal scales 11-19; scales behind eye 2-3; scales to preopercular angle 3-6; gill rakers 3-5 + 9-12 = 13-16; pseudobranch filaments 7-10; circumorbital pores 18-65; preopercular pores 10-28; dentary pores 4-5; posterior interorbital pores 1-2.

Lower lip varying from incomplete with weak to moderate interruption to complete; dorsal and anal fins without scale sheaths, although often with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from mid AIO pores to midway between anterior AIO and posterior nasal pores; opercle with 0-7, usually small, indistinct serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or with well-developed teeth mainly confined to raker tips; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1/1/1/1 + 1*/1/1; dorsal-fin spines slender and weakly pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1/1 + 1*/1*; anal-fin spines slender and weakly pungent to flexible, second spine varying from about as stout to less stout than third; pelvic-fin spine slender and weakly pungent to flexible; second or third segmented pelvic-fin ray longest; caudal fin rounded, often with posterior margin weakly rounded to truncate; vertebrae 10 + 16; epineurals 15-17; epurals 2.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 13 specimens, 23.1-48.4 mm SL): head length 23.2-27.0; orbit diameter 7.4-10.0; snout length 5.2-6.5; fleshy interorbital width 3.5-4.8; bony interorbital width 2.4-3.5; body width 11.2-13.2; snout tip to posterior tip of retroarticular bone 11.2-14.3; predorsal length 31.2-34.6; prepelvic length 29.0-32.5; posterior tip of retroarticular bone to pelvic-fin origin 17.4-19.9; dorsal-fin origin to pelvic-fin origin 24.9-27.3; dorsal-fin origin to middle dorsal-fin ray 29.0-32.4; dorsal-fin origin to anal-fin origin 38.0-41.1; pelvic-fin origin to anal-fin origin 29.2-32.3; middle dorsal-fin ray to dorsal-fin termination 23.9-27.1; middle dorsal-fin ray to anal-fin origin 22.6-25.6; anal-fin origin to dorsal-fin termination 31.3-35.9; anal-fin base length 22.8-25.9; dorsal-fin termination to anal-fin termination 14.8-17.6; dorsal-fin termination to caudal peduncle dorsal edge 12.8-14.2; dorsal-fin termination to caudal peduncle ventral edge 20.1-21.7; anal-fin termination to caudal peduncle dorsal edge 20.7-23.9; anal-fin termination to caudal peduncle ventral edge 15.2-16.7; first dorsal-fin spine 1.0-2.7; second dorsal-fin spine 3.4-5.6; third dorsal-fin spine 6.0-9.1; first segmented dorsal-fin ray 9.3-12.3; fourth last segmented dorsal-fin ray 14.9-17.3; first anal-fin spine 0.7-2.6; second anal-fin spine 3.1-5.0; third anal-fin spine 5.2-7.6; first segmented anal-fin ray 8.7-11.5; fourth last segmented anal-fin ray 13.0-16.0; third pectoral-fin ray 13.4-16.7; pelvic-fin spine 6.9-10.8; second segmented pelvic-fin ray 17.8-20.8; caudal-fin length 20.0-24.2.

Live coloration: Females (based on photographs of specimens from Malaysia, Indonesia, Western Australia, the Great Barrier Reef, New Caledonia and the Solomon Ids, field observations at One Tree Id, Great Barrier Reef and captive specimens; Plate 5G): head and body dark brown to dark grey-brown, paler ventrally on head and breast; iris grey to bright

orange-red with blue suboval ring around pupil; posterior part of caudal peduncle sometimes reddish or yellowish grey to bright red; dorsal fin bright red, bluish to reddish grey or dark grey basally, becoming yellowish, reddish or greyish hyaline to grey distally, usually with 1-6 fine red to grey stripes or rows of dashes on paler section of fin, sometimes with reddish grey to grey submarginal stripe on distal part of fin; anal fin usually reddish grey to grey basally, remainder of fin reddish to greyish hyaline, sometimes with reddish grey to grey submarginal stripe distally on fin; caudal fin yellowish grey to bright orange-red or dark grey basally, becoming bright yellow to yellowish or greyish hyaline posteriorly, usually with grey distal margin; pectoral and pelvic fins pinkish hyaline to hyaline. Males (based on photographs of specimens from the Ryukyu Ids, Taiwan, Western Australia, the Great Barrier Reef, New Caledonia and the Solomon Ids, field observations at One Tree Id, Great Barrier Reef, and captive specimens; Plate 5H): body and dorsal contour of head dark grey to black, usually with greenish to bluish sheen; lips and lower part of head yellowish brown to bright yellow; iris varying from yellowish brown or bright yellow to bright red, with bright blue suboval ring around pupil; breast and ventral part of body anterior to middle of pectoral fin yellowish brown to bright yellow; scales of ascending portion of anterior lateral line and of scale row immediately below horizontal portion of anterior lateral line yellowish brown to bright yellow; sides of caudal peduncle and body within dark grey to black section usually with series of bluish grey to bright blue oblique bars, these usually strongest above anal fin and on caudal peduncle; basal two-thirds to three-quarters of dorsal fin dark grey to black with bluish to greenish sheen, remainder of fin pale blue to greyish hyaline; anal fin pale blue to greyish hyaline or hyaline, usually with basal portion dark grey to black with bluish to greenish sheen; basal two-thirds of caudal fin dark grey to black with bluish to greenish sheen, remainder of fin pale blue to greyish hyaline or hyaline; pectoral fins bright yellowish hyaline; pelvic fins yellowish hyaline to bright yellow.

Preserved coloration: Juveniles and females: pattern similar to live coloration, head and body becoming pale brown to brown or greyish brown, darker dorsally; posttemporal pore patch not notably darker than adjacent head coloration; dorsal fin becoming dusky hyaline, slightly darker basally, red to grey markings becoming grey to brown; anal fin similar but paler without grey to brown markings; caudal fin becoming brownish to greyish basally with remainder of fin dusky hyaline to hyaline, usually paler dorsally and ventrally; caudal fin sometimes dark grey with pale base and pale to hyaline distal margins; pectoral fins hyaline; pelvics becoming hyaline to pale brown. Males: pattern similar to live coloration, dark grey to black areas on head, body and fins becoming dark brown to black; yellowish brown to bright yellow areas on head and body becoming pale brown to brown; bluish grey to bright blue oblique bars rarely remain, becoming pale grey; pale areas on dorsal, anal and caudal fins becoming hyaline to pale brown; pectoral fins hyaline; pelvic fins hyaline to pale brown.

HABITAT AND DISTRIBUTION: *Pseudochromis cyanotaenia* is widely distributed throughout the West Pacific, from the east coast of Peninsular Malaysia south to Western Australia, north to the Ryukyu Ids, and east to Kiribati (Figure 34). Two specimens (USNM 112286) of this species in the United States National Museum of Natural History are from Pearl Harbour, Oahu in Hawaii. However, they were collected from the base of a dock that had been towed to Hawaii from Guam one year previously, and are therefore treated here as artificial introductions. Randall (1963: 435; see also Randall, 1976: 51) discussed the possibility that the type specimens of the cirrhitid *Cirrhitichthys serratus* Randall, which were collected in Oahu with the above-mentioned specimens of *P. cyanotaenia*, may have originated from Guam; Randall (1997) has recently concluded that they did indeed originate from Guam, and placed *C. serratus* in junior synonymy with *C. falco* Randall. *Pseudochromis cyanotaenia* has been observed (pers. obs.) and collected from coral and rock reefs in a variety of habitats including tidal pools, reef flats, lagoonal patch reefs and reef slopes at depths ranging to 30 m, although it appears to be most abundant in high current or surge areas.

COMPARISONS: *Pseudochromis cyanotaenia* closely resembles *P. coccinicauda, P. melanurus, P. tapeinosoma* and *P. viridis* and has been previously confused with these species. Characters distinguishing these species are discussed under *Comparisons* for *P. coccinicauda*. The low segmented dorsal- and anal-fin ray counts (21-23 [rarely 21 or 23] and 12-14 [rarely 12 or 14], respectively) in combination with the presence of weakly pungent to flexible fin spines readily distinguish *P. cyanotaenia* from all other pseudochromines.

REMARKS: *Pseudochromis cyanotaenia* is a relatively small species; the largest examined specimen measured 50.3 mm SL. Sexual dimorphism in this species was first noted by McCulloch (1926). This is confirmed here from a superficial examination of the gonads of museum specimens, from field observations of courting pairs at One Tree Id, southern Great Barrier Reef (pers. obs.), and from aquarium observations of a breeding pair by Birkholz (1985). Several of the male specimens examined in the present study had ovarian tissue ventrad to the testes. This, in combination with the observations that most small sexable specimens were females and that all juveniles showed the female coloration, suggests that the species is a protogynous hermaphrodite. Live colour illustrations of females of *P. cyanotaenia* are given in Masuda et al. (1975: pl. 53g), Hayashi (1984: pl. 126, fig. a), Allen (1985: fig. 150), Gill (1993, 1997) and Gill & Allen (1996: fig. 6) and photographs of males are given in Burgess & Axelrod (1974: fig. 265), Masuda et al. (1975: pl. 53g), Hayashi (1984: pl. 126, fig. b), Allen (1985: fig. 149), Gill (1990b, 1997), Michael (1990b), Gill (1990b, 1993), Kuiter (1992), Fosså & Nilsen (1993), Masuda & Kobayashi (1994: fig. 6), Gill & Allen (1996: fig. 3) and Myers (1999).

Although this species has been referred to as *P. tapeinosoma* in most recent literature, *P. tapeinosoma* is a senior synonym for the species that had been known previously as *P. melanotaenia* (see *Remarks* for *P. tapeinosoma*).

Bleeker's (1857) two syntypes of *P. cyanotaenia* are in RMNH 5962, along with four additional specimens that were added subsequently by Bleeker (Gill, 1995: 245). All of the specimens in the lot are the present species. Aoyagi's (1941c) holotype of *P. kikaii* was examined and is also the present species. However, based on meristic values provided by

Aoyagi, the original description appears to be composite and probably based partly on *P. luteus*.

ETYMOLOGY: The specific epithet is from the Greek *kyanos*, dark blue, and the Latin *taenia*, ribbon, and alludes to the blue oblique bars posteriorly on the sides of the male of the species. In keeping with common usage, it is here treated as a noun in apposition.

MATERIAL EXAMINED: HONG KONG: Cape D'Aguilar, CAS 60992, 2(0). VIETNAM: Nhatrang vicinity, N shore of Binhchang Bay, AMS I.31415-001, 6(6), 35.4-41.1 mm SL, CAS 60976, 7(0), 36.0-43.5 mm SL; off southern tip of Cu Lao Hon, W shore of Cu Lao Thu, CAS 62967, 2(2), 35.3-43.7 mm SL. PENINSULAR MALAYSIA: Tioman Id, off Bunut, BPBM 22004, 5(5), 24.5-38.2 mm SL, BPBM 21923, 3(0), 32.0-35.0 mm SL; Tioman Id, off Merlin Hotel pier, BPBM 21949, 2(0), 31.0-40.0 mm SL. RYUKYU (RIU-KIU) IDS, JAPAN: YCM P.15892, 1(0); Okinawa, 1.5 km N of Sate, USNM 290331, 1(1), 35.2 mm SL; Okinawa, Komesu, YCM P.12822, 1(0), 18.2 mm SL; Kikai Id, YCM 6886, 1(1), 31.8 mm SL (holotype of *P. kikaii* Aoyagi). TAIWAN: Ch'uan-Fan-Shih, USNM 290811, 4(4), 36.9-40.2 mm SL. PHILIPPINES: Batan Ids, Yami Id, USNM 291617, 1(0); Batan Ids, Batan Id, Chawa Point, USNM 291614, 11(0); Batan Ids, Batan Id, White Beach, USNM 292615, 1(0); Batan Ids, Ibahos Id, USNM 291606, 46(0); Luzon, Bolinao, USNM 232044, 2(0); Luzon, Batangas, Sombrero Id, AMS I.21909-013, 1(0), 35.0 mm SL, USNM 232045, 1(0); Cuyo Ids, NW side of Putic Id, USNM 290826, 17(10, 33.2-38.9 mm SL), 32.4-41.6 mm SL; Babuyan Ids, Maybag Id, USNM uncat., 1(1), 38.8 mm SL, UNSM uncat., 1(1), 35.9 mm SL, USNM uncat., 1(1), 34.6 mm SL, USNM uncat., 1(1), 41.0 mm SL; Babuyan Ids, Fuga Id, USNM uncat., 1(1), 40.3 mm SL; southern Negros, USNM 51997, 1(0); Negros, Maloh, USNM 290764, 2(0), USNM 290835, 1(0); Negros, Dumaguete, CAS-SU 33676, 1(0), 42.1 mm SL. INDONESIA: RMNH 5962, 6(4, 35.3-40.8 mm SL), 35.3-40.8 mm SL (Bleeker specimens of *Pseudochromis cyanotaenia*, presumably including the syntypes); Morotai Id, USNM 147695, 7(4, 22.4-36.4 mm SL), 16.3-36.4 mm SL; Ambon, Sikula Point, BPBM 19286, 1(1), 40.8 mm SL; Saparua, Haria Bay, USNM 290964, 19(0); Bali, Sanur Beach, NTM S.11081-029, 9 (4, 31.7-37.0 mm SL), 17.5-37.0 mm SL; S side of Great Banda Id, AMS I.19875-047, 5(0), 20.0-40.0 mm SL. NORTH-WESTERN AUSTRALIA: Timor Sea, Ashmore Reef, West Id, WAM P.29041-007, 3(3), 24.5-30.0 mm SL, WAM P.29056-001, 2(2), 33.5-34.5 mm SL; Timor Sea, Scott Reef, AMS I.21318-031, 10(6, 24.3-28.6 mm SL), 14.5-30.0 mm SL; Timor Sea, Rowley Shoals, Clerke Reef, WAM P.28025-009, 7(7), 25.1-38.6 mm SL; Timor Sea, Rowley Shoals, Clerke Reef, S end of Bedwell Id, WAM P.28029-005, 1(1), 32.8 mm SL; Western Australia, NW side of Serrurier Id, MPM 32610, 1(0), 39.0 mm SL; Western Australia, Muiron Ids, South Muiron Id, WAM P.25815-012, 3(0), 24.6-33.8 mm SL; Western Australia, North West Cape, Tantabiddi Creek., AMS I.19641-002, 6(0), 25.0-35.0 mm SL; Western Australia, Point Quobba, Fitzroy Reefs, WAM P.27967-011, 1(1), 50.3 mm SL. BELAU: Kayangel Atoll, CAS 62960, 50(0); Ngaremdiu Reef, CAS 60959, 6(0), 19.4-33.3 mm SL. MARIANA IDS: Saipan, CAS 62953, 5(0); Saipan, Unai Fahrang, ANSP 114720, 3(0), 22.8-28.6 mm SL; Rota, USNM 139726, 1(0); Guam, USNM 139858, 6(0); Guam, Agat Bay, N of Pelagi Id, UG 6093, 3(2, 33.9-36.3 mm SL), 33.9-36.3 mm SL. CAROLINE IDS: Yap Id, Map Id, CAS 62965, 2(0); Ulithi Atoll, Sorlen Id, CAS 62946, 9(0); Ifalik Atoll, Falarik Id, CAS 62878, 6(0); Pohnpei, USNM 223408, 1(0), USNM 224701, 16(0); Kosrae Id, Mwot Passage, BPBM 28310, 1(0), 35.0 mm SL; Kapingamarangi Atoll, near Teawataman Ship Pass, AMS I.31420-001, 11(11), 33.2-36.0 mm SL, CAS 65785, 2(0), 33.0-37.0 mm SL, CAS 65797, 4(0), 30.3-36.7 mm SL. MARSHALL IDS: Enewetak Atoll, Mui Id, USNM 140690, 5(0); Enewetak Atoll, Giriinien Id, USNM 140691, 5(0); Enewetak Atoll, Igurin (Glenn) Id, BPBM 8522, 15(0), 30.0-41.0 mm SL; Bikini Atoll, Eman Id, USNM 140698, 8(3, 36.5-40.0 mm SL), 14.9-40.0 mm SL; Rongelap Atoll, Mullu Id, USNM 140686, 1(0). KIRIBATI: Abaiang Atoll, off Bolton Point, AMS I.18052-077, 3(3), 30.5-33.9 mm SL; Abaiang Atoll, off Teirio Id, AMS I.18044-052, 1(1), 29.2 mm SL, AMS I.18046-013, 2(2), 29.3-36.8 mm SL; Marakei, BPBM 9260, 3(0), 37.0-38.0 mm SL. PAPUA NEW GUINEA: Ninigo Ids, Meman Id, USNM 290702, 1(0), USNM 290723, 1(0); New Ireland, N of Kavieng, USNM 292024, 5(0); Bagabag Id, CAS 65788, 3(0), 33.0-36.0 mm SL, USNM 246233, 1(0); Umboi Id, Higgins Point, USNM 292064, 1(0); Trobriand Ids, Kiriwina, NW of Gusaweta, USNM 290569, 7(0); Samarai, AMS IA.5777, 1(1), 32.5 mm SL. EASTERN AUSTRALIA: Torres Strait Ids, Murray Id, QM I.4015, 4(4), 21.2-30.2 mm SL; Great Barrier Reef, Raine Id, AMS I.20912-007, 1(0), 27.0 mm SL; Sir Charles Hardy Ids, South Id, AMS I.20770-118, 14(0), 30.0-39.0 mm SL; off Cape Melville, AMS I.20774-134, 1(0), 27.0 mm SL; Great Barrier Reef, Lizard Id, AMS I.19473-206, 97(0), 16.0-40.0 mm SL, AMS I.19473-227, 2(2), 34.8-37.7 mm SL (cleared and stained); Great Barrier Reef, Escape Reef, AMS I.22600-047, 13(0), 18.0-44.0 mm SL; Great Barrier Reef, Endeavour Reef, ANSP 121986, 26(0), 21.5-39.0 mm SL; Great Barrier Reef, Bushy Id, QM I.13294, 2(2), 40.1-42.7 mm SL; Great Barrier Reef, Heron Id, QM I.7084, 3(3), 38.2-44.9 mm SL; Great Barrier Reef, One Tree Id, AMS I.17445-111, 3(2, 34.8-39.3 mm SL), 31.9-39.3 mm SL, AMS I.20549-003, 4(0), 42.0-45.0 mm SL, AMS I.31553-001, 3(3), 30.0-40.5 mm SL (cleared and stained); New South Wales, Cook Id, QM I.21711, 1(1), 48.4 mm SL. SOLOMON IDS: New Georgia, Munda, outer reef off Olson's Landing, USNM 290977, 6(6), 21.3-35.8 mm SL; Savo Id, AMS I.17490-058, 2(0), 31.0-38.0 mm SL, BPBM 16125, 3(0), 28.0-38.0 mm SL. VANUATU (NEW HEBRIDES): Efate Id, BPBM 29209, 1(0), 29.0 mm SL. NEW CALEDONIA: MNHN 1980-370, 1(1), 33.3 mm SL; Chesterfield Bank, Ilot Du Mouillage, BPBM 33729, 12(12), 33.4-42.1 mm SL; Loyalty Ids, MNHN 1980-450, 1(1), 41.0 mm SL; Loyalty Ids, Ouvea, USNM 322981, 3(3), 36.7-44.5 mm SL.

Pseudochromis dilectus Lubbock
Sri Lankan Dottyback
Figure 30; Plate 5I

Pseudochromis dilectus Lubbock, 1976: 172, fig. 2 (type locality: Station Reef, Trincomalee, Sri Lanka); Hargreaves, 1978: 99 (colour fig.); Burgess et al., 1988: pl. 153 (colour figs).

DIAGNOSIS: *Pseudochromis dilectus* is distinguished from congeners in having the following character combination: segmented dorsal-fin rays 29-31; segmented anal-fin rays 15-16 (usually 16); circumpeduncular scales 20-21; predorsal

scales 18-26; teeth of outer ceratobranchial-1 gill rakers either weakly developed or well developed on raker tips only; and dorsal and anal fins with well-developed scale sheaths.

DESCRIPTION (based on 18 specimens, 19.9-71.0 mm SL): dorsal-fin rays III,29-31, last 4-30 segmented rays branched (all or all but first 1-2 branched in specimens larger than about 45 mm SL); anal-fin rays III,15-16, last 4-16 segmented rays branched (all branched in specimens larger than 30 mm SL); pectoral-fin rays 17-19; upper procurrent caudal-fin rays 6-8; lower procurrent caudal-fin rays 6; total caudal-fin rays 29-31; scales in lateral series 41-47; anterior lateral-line scales 34-39; anterior lateral line terminating beneath segmented dorsal-fin ray 22-26; posterior lateral-line scales 0-11 + 0-3; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 14-17 + 1 + 2-4 = 17-22; circumpeduncular scales 20-21; predorsal scales 18-26; scales behind eye 2-4; scales to preopercular angle 5-6; gill rakers 4-7 + 11-12 = 15-19; pseudobranch filaments 9-11; circumorbital pores 12-86; preopercular pores 9-37; dentary pores 4; posterior interorbital pores 1-3.

Lower lip incomplete; dorsal and anal fins with well-developed scales sheaths; predorsal scales extending anteriorly to point ranging from vicinity of posterior nasal pores to midway between posterior nasal pores and posterior nostrils; opercle with 3-6, usually relatively well-developed serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or well developed on raker tips only; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1 + 1/1/1 + 1*/1; dorsal-fin spines stout, tips pungent; anterior anal-fin pterygiophore formula 3/1/1 + 1*/1/1 + 1/1; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout to stout with pungent tip; second or third segmented pelvic-fin ray longest; caudal fin rounded, often with posterior margin truncate, small (< 30 mm SL) specimens with posterior margin weakly emarginate; vertebrae 10 + 16; epineurals 13-14, epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw slightly larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 14 specimens, 29.4-71.0 mm SL): head length 21.7-27.5; orbit diameter 6.8-10.5; snout length 5.3-6.5; fleshy interorbital width 4.9-6.1; bony interorbital width 3.1-3.9; body width 11.5-13.8; snout tip to posterior tip of retroarticular bone 13.5-15.0; predorsal length 29.2-34.9; prepelvic length 30.8-32.9; posterior tip of retroarticular bone to pelvic-fin origin 17.1-20.4; dorsal-fin origin to pelvic-fin origin 26.5-32.1; dorsal-fin origin to middle dorsal-fin ray 32.5-39.9; dorsal-fin origin to anal-fin origin 40.3-47.2; pelvic-fin origin to anal-fin origin 26.5-32.4; middle dorsal-fin ray to dorsal-fin termination 24.9-30.4; middle dorsal-fin ray to anal-fin origin 25.8-31.0; anal-fin origin to dorsal-fin termination 33.3-39.7; anal-fin base length 26.5-30.7; dorsal-fin termination to anal-fin termination 14.2-18.3; dorsal-fin termination to caudal peduncle dorsal edge 9.2-11.5; dorsal-fin termination to caudal peduncle ventral edge 17.6-20.0; anal-fin termination to caudal peduncle dorsal edge 18.6-21.5; anal-fin termination to caudal peduncle ventral edge 11.0-12.9; first dorsal-fin spine 2.7-3.8; second dorsal-fin spine 4.5-7.4; third dorsal-fin spine 6.5-9.5; first segmented dorsal-fin ray 9.6-12.9; fourth last segmented dorsal-fin ray 15.7-19.7; first anal-fin spine 2.7-5.0; second anal-fin spine 6.5-12.0; third anal-fin spine 5.8-10.6; first segmented anal-fin ray 8.5-13.6; fourth last segmented anal-fin ray 16.3-18.8; third pectoral-fin ray 11.8-17.8; pelvic-fin spine 9.0-10.8; second segmented pelvic-fin ray 18.5-21.2; caudal-fin length 23.2-26.0.

Live coloration (based on colour description in Lubbock, 1976, colour figures given in Burgess et al., 1988, and a colour photograph of a specimen from Trincomalee, Sri Lanka; Plate 5I): head and anterior third of body either bright greenish yellow to bright orange, or dark grey-brown to black; remainder of body becoming bluish grey to dark grey-brown or black; blue curved line extending anteroventrally around posterior rim of orbit to upper lip; operculum with a series of fine horizontally aligned vermiculate gold lines; iris dark red to bright red with horizontal blue line above and below pupil; scales of dorsoanterior part of body each with dark bluish grey to black central spot, these becoming less distinct below posterior part of dorsal fin; dorsal fin either black with blue distal margin or blue-grey basally, sometimes red distally, with blue distal margin, blue-grey basal area indistinctly with several rows of small yellow to red spots and streaks; anal fin similar to dorsal fin except without rows of yellow to red spots; caudal fin dark bluish grey to black, sometimes reddish hyaline distally, with blue margin; pectoral fins hyaline; pelvic fins hyaline to dusky hyaline.

Preserved coloration: pattern similar to live coloration, head and body pale brown to dark grey-brown; dark spots on body scales and dark markings on head remain, becoming dusky brown to dark grey; blue markings on fins becoming greyish brown to grey; red and yellow markings on fins becoming pale brown.

HABITAT AND DISTRIBUTION: *Pseudochromis dilectus* is known only from Sri Lanka (Figure 30). It has been collected around boulders and coral rocks, sometimes amongst hard and segmented corals or sponges, at depths ranging from 7.5 to 20 m.

COMPARISONS: *Pseudochromis dilectus* is relatively distinct in having in combination well-developed scale sheaths on the dorsal and anal fins, 20-21 circumpeduncular scales, and 29-31 segmented dorsal-fin rays. The only other pseudochromines with this character combination are *P. fuscus, P. linda* (which usually has fewer than 29 segmented dorsal-fin rays with, at best, weakly developed dorsal- and anal-fin scale sheaths) and *Ogilbyina salvati*. It differs from *P. fuscus* in having the well-developed teeth on the outer ceratobranchial-1 gill rakers mainly confined to the raker tips (versus running most of the raker lengths), more segmented anal-fin rays (15-16, usually 16 versus 13-15, usually 14), and usually more segmented

dorsal-fin rays (29-31 versus 25-29, usually 26-27 at most localities). It differs from *P. linda* in having fewer predorsal scales (18-26 versus 26-36), fewer total horizontal scale rows above anal-fin origin (17-22 versus 21-27), and in lacking a large dark spot on the opercular flap (present in *P. linda*). *Ogilbyina salvati* is unlikely to be confused with *P. dilectus* as it has, for example, more segmented anal-fin rays (19-21 versus 15-16), a complete lower lip (versus incomplete), a broad triangular patch of teeth on the vomer (versus a narrow chevron-shaped patch), and distinctive dark brown (bright blue in life) spots on the head and anterior part of the body (absent in *P. dilectus*).

REMARKS: *Pseudochromis dilectus* is a moderately large species; the largest specimen examined measured 71.0 mm SL. It has two colour forms. In one the head and the anterior part of the body are bright greenish yellow to bright orange, and in the other the head and the anterior part of the body are dark grey-brown to black. The two forms have been illustrated by Burgess et al. (1988). Lubbock (1976) noted (and this study concurs) that both forms may occur at the same locality but that they are not associated with sex.

ETYMOLOGY: The specific epithet is from the Latin for esteemed with reference to the beautiful coloration of the yellow-headed form of this species.

MATERIAL EXAMINED: SRI LANKA: BMNH 2000.5.16.1, 1(1), 59.8 mm SL (subsequently cleared and stained); Nilaveli, Pigeon Id, BMNH 1973.12.20.239-240, 2(0), 32.9-36.2 mm SL (paratypes); 7 km N of Trincomalee, USNM 212216, 1(0), 45.0 mm SL (paratype); Trincomalee, USNM 212215, 2(0), 40.0-44.8 mm SL (paratypes), USNM 290113, 1(1), 29.4 mm SL, USNM 290333, 3(0); Trincomalee, Station Reef, BMNH 1973.12.20.238, 1(1), 48.9 mm SL (holotype), BPBM 18037, 1(1), 32.7 mm SL (paratype); Trincomalee, Lively Rocks, AMS I.18170-001, 1(1), 43.5 mm SL (paratype), BPBM 18841, 2(2), 19.9-32.5 mm SL; Trincomalee, Coral Cove, SMF 12991, 1(0), 33.3 mm SL (paratype); Trincomalee, S of Fort Frederick's Entrance, USNM 290090, 2(2), 42.5-47.4 mm SL; Kalkudah Bay, USNM 290088, 2(2), 31.9-50.0 mm SL; Kalmunai, USNM 290302, 2(2), 29.5-51.5 mm SL; Koratipattu, Passakudah Bay, USNM 290087, 4(4), 40.7-52.5 mm SL; Colombo vicinity, BMNH 1975.2.12.1, 1(1), 71.0 mm SL (paratype).

Pseudochromis dixurus **Lubbock**

Fork-tailed Dottyback

Figure 33; Plates 5J, 6A

Pseudochromis dixurus Lubbock, 1975: 130, pl. 1, fig. a (type locality: Port Sudan, Red Sea); Randall, 1983: 59 (description; colour fig.); Dor, 1984: 106 (list); Burgess et al., 1988: pl. 153 (colour fig.); Baensch & Debelius, 1992: 971 (colour fig.); Debelius, 1993: 112 (colour fig.; habitat and distribution); Goren & Dor, 1994: 28 (list); Lieske & Myers, 1994: pl. 32, fig. 3 (colour fig.; habitat and distribution); Debelius, 1996: 112 (colour fig.; habitat and distribution); Field & Field, 1998: 77 (colour fig.); Debelius, 1998: 68 (colour fig.; habitat and distribution).

DIAGNOSIS: *Pseudochromis dixurus* is distinguished from congeners in having the following character combination: segmented dorsal-fin rays 25-28 with all or all but first rays branched; segmented anal-fin rays 13-15 (usually 14); circumpeduncular scales 20; gill rakers 7-9 + 16-17 = 23-26; dorsal-fin origin to pelvic-fin origin 26.2-31.1 % SL; and opercular flap with a dusky grey to black spot. It is also distinctive in having a deeply forked to lunate caudal fin.

DESCRIPTION (based on 14 specimens, 43.5-69.6 mm SL): dorsal-fin rays III,25-28, all, or all but first segmented rays branched; anal-fin rays III,13-15, all segmented rays branched; pectoral-fin rays 16-18; upper procurrent caudal-fin rays 7-8; lower procurrent caudal-fin rays 7-8; total caudal-fin rays 31-33; scales in lateral series 42-47; anterior lateral-line scales 26-34; anterior lateral line terminating beneath segmented dorsal-fin ray 14-21; posterior lateral-line scales 6-13 + 0-2; scales between lateral lines 4-6; horizontal scale rows above anal-fin origin 14-17 + 1 + 2-4 = 18-21; circumpeduncular scales 20; predorsal scales 20-25; scales behind eye 3-5; scales to preopercular angle 5-7; gill rakers 7-9 + 16-17 = 23-26; pseudobranch filaments 10-15; circumorbital pores 23-37; preopercular pores 14-20; dentary pores 4-5; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of posterior AlO pores to anterior AlO pores; opercle with 4-8, usually relatively small serrations; teeth of outer ceratobranchial-1 gill rakers well-developed, arranged in two rows running most of length of rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1 + 1*/1 + 1*/1 or /S + S/S + 3/1 + 1/1/1/1/1/1 + 1; dorsal-fin spines moderately stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/I + 1*; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine moderately stout and pungent; second segmented pelvic-fin ray longest; caudal fin strongly forked to lunate; vertebrae 10 + 16; epineurals 13-14; epurals 3.

Upper jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 6-7 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 10 specimens, 45.3-69.6 mm SL): head length 23.9-25.7; orbit diameter 7.6-9.9; snout length 6.3-7.3; fleshy interorbital width 5.2-6.2; bony interorbital width 3.5-4.2; body width 10.1-12.5; snout tip to posterior tip of retroarticular bone 13.8-16.1; predorsal length 31.3-36.1; prepelvic length 32.2-34.2; posterior tip of retroarticular bone to pelvic-fin origin 18.5-21.0; dorsal-fin origin to pelvic-fin origin 26.2-31.1; dorsal-fin origin to middle dorsal-fin ray 30.0-

35.1; dorsal-fin origin to anal-fin origin 40.2-44.1; pelvic-fin origin to anal-fin origin 25.4-31.9; middle dorsal-fin ray to dorsal-fin termination 22.6-27.3; middle dorsal-fin ray to anal-fin origin 24.9-29.7; anal-fin origin to dorsal-fin termination 31.3-34.5; anal-fin base length 22.9-26.7; dorsal-fin termination to anal-fin termination 14.6-17.1; dorsal-fin termination to caudal peduncle dorsal edge 12.4-14.8; dorsal-fin termination to caudal peduncle ventral edge 18.7-22.0; anal-fin termination to caudal peduncle dorsal edge 20.0-22.7; anal-fin termination to caudal peduncle ventral edge 13.7-15.8; first dorsal-fin spine 1.3-2.3; second dorsal-fin spine 3.9-5.3; third dorsal-fin spine 6.7-8.4; first segmented dorsal-fin ray 11.5-13.6; fourth last segmented dorsal-fin ray 15.2-18.1; first anal-fin spine 1.0-2.6; second anal-fin spine 4.0-7.0; third anal-fin spine 6.7-8.5; first segmented anal-fin ray 10.6-13.7; fourth last segmented anal-fin ray 14.6-16.9; third pectoral-fin ray 15.1-16.8; pelvic-fin spine 8.9-11.4; second segmented pelvic-fin ray 20.3-27.4; caudal-fin length 16.1-17.9.

Live coloration: Striped form (based on photographs of specimens from Sudan, Egypt and on description given by Lubbock, 1975; Plate 5J): head and body pale grey to white, dorsal contour of head and body dark bluish or brownish grey to olive-grey; pale-edged dark grey to black stripe extending from snout tip to eye, this bisected by narrow pale blue to blue median stripe; dark grey to black stripe continuing from behind eye to upper lobe of caudal fin, stripe becoming yellowish brown to bright yellow posteriorly; second stripe extending from midposterior part of upper lip below eye to lower lobe of caudal fin, stripe greyish yellow or bright yellow to bright red anteriorly, becoming bright yellow to bright orange-yellow posteriorly; dark grey to black spot on opercular flap, this edged posteriorly with pale yellow to gold; iris pale orange to reddish brown with two bright blue oblique stripes, one above and one below pupil; dorsal fin bluish hyaline to hyaline, sometimes with dusky blue to grey basal stripe; anal fin bluish hyaline to hyaline, sometimes with one or two basal yellow to orange stripes or rows of spots; caudal fin white or yellowish hyaline to bluish hyaline or hyaline between bright yellow to bright orange-yellow stripes, upper and lower edges of fin sometimes bright blue; pectoral fins hyaline; pelvic fins pale bluish or whitish hyaline to hyaline. Dark form (based on photographs of specimens from Sudan and Egypt and on description given by Lubbock, 1975; Plate 6A): head and body dark pinkish or orangish brown to dark olive-grey, becoming pale grey to yellowish grey ventrally and posteriorly; dorsal contour of head and body and ventral contour of body behind point varying from anal-fin origin to pelvic-fin origin dark bluish grey to dark grey; dusky grey spot on opercular flap, this edged posteriorly with pale yellow to gold; bright blue-edged orange-brown stripe from middle of upper lip to eye, this bisected by bright blue median stripe; posterior edge of upper lip sometimes orange-brown; iris bright orange to reddish brown with two bright blue oblique stripes, one above and one below pupil; dorsal fin bluish or orangish hyaline to hyaline with dark grey basal stripe and blue distal margin; distal part of anterior portion of fin sometimes bright yellow to bright orange; anal fin bluish hyaline to hyaline, usually with one or two yellow to orange basal stripes or rows of spots; caudal-fin lobes dark grey to black with upper and lower margins blue; central area of caudal fin pale grey basally, becoming hyaline posteriorly; pectoral and pelvic fins pinkish or yellowish hyaline to hyaline.

Preserved coloration: Striped form: pattern similar to live coloration, pale grey to white areas becoming pale yellow-brown; dorsal contour of head and body becoming brown; stripe from snout tip to upper caudal lobe becoming brown to dark brown; lower stripe from below eye to lower caudal lobe becoming pale brown; dorsal fin becoming hyaline, dusky basally; anal fin hyaline; caudal fin brownish hyaline, dusky brown where body stripes terminate; pectoral and pelvic fins hyaline. Dark form: pattern similar to live coloration, head and body becoming uniform dark brown; dorsal and anal fins becoming dusky hyaline to hyaline, dusky grey to brown basally; caudal fin dark grey to black, greyish hyaline to hyaline centrally; pectoral and pelvic fins hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis dixurus* is known only from the Red Sea, from the Gulf of Aqaba south to the Farasan Ids (Lubbock, 1975: 131; Figure 33). It has been collected and photographed around rocks and in small caves at depths ranging from 4 to 60 m. According to Lubbock (1975: 130), it is more abundant in the deeper part of this range.

COMPARISONS: *Pseudochromis dixurus* is distinctive among pseudochromids in having a deeply-forked to lunate caudal fin.

REMARKS: *Pseudochromis dixurus* is a moderate-sized species; the largest specimen examined measured 69.6 mm SL. As noted above, this species has a striped and a dark colour form. The striped form has been illustrated by Lubbock (1975), Randall (1983), Burgess et al. (1988, 1991), Baensch & Debelius (1992), Debelius (1993, 1996, 1998) and Field & Field (1998). Based on a superficial examination of gonads, these colourations are not sexually associated. Lubbock (1975) suggested that the colour forms are associated with size. This is corroborated in the present study; specimens with the striped coloration were all less than 65 mm SL, whereas those with the dark coloration ranged from 53.6 to 69.6 mm SL.

ETYMOLOGY: The specific epithet is from the Greek *dixoos*, forked, and *oura*, tail, with reference to the distinctive caudal fin shape.

MATERIAL EXAMINED: GULF OF AQABA: Israel, El Himira, BPBM 21522, 1(1), 53.6 mm SL, USNM 211765, 1(0), 30.5 mm SL; 1 km N of Coral Id, BPBM 18210, 3(3), 43.5-49.1 mm SL (43.5 mm SL specimen subsequently cleared and stained); Jordan, Aqaba, BMNH 1973.12.20.27-28, 2(0), 21.5-52.6 mm SL (paratypes). SUDAN: Sanganeb Atoll, BPBM 20349, 1(1), 47.4 mm SL, BPBM 20350, 1(1), 49.5 mm SL; Port Sudan Harbour, BMMH 1973.12.20.21, 1(1), 69.6 mm SL (holotype); N of Suakin, BPBM 20359, 2(2), 59.6-64.2 mm SL, BPBM 20360, 1(1), 54.4 mm SL; Suakin Harbour, off marine lab jetty, BPBM 17898, 3(3), 50.7-64.9 mm SL, BPBM 17906, 1(1), 63.1 mm SL. SAUDI ARABIA: Jiddah, BPBM 16409, 1(0), 22.5 mm SL (paratype).

***Pseudochromis dutoiti* Smith**
Afriean Blue-lined Dottyback
Figures 25-28; Plate 6B

Pseudochromis dutoiti Smith, 1955a: 145, fig. 1 (type locality: Bazaruto Id, Mozambique); Smith, 1955b: 8, fig. 7 (Inhaca and Bazaruto Ids, Mozambique); Lubbock, 1975: 142 (description and distribution in part; Kenya and Mozambique localities only); Lubbock, 1977: 4, pl. 3e (description and distribution in part; South Africa, Mozambique and Kenya localities only); Smith, 1980: 176 (Maputaland, South Afriea); Smith, 1986: 540, pl. 44; Allen & Steene, 1987: pl. 32, fig. 1 (Sodwana Bay, South Africa); Burgess et al., 1988: pl. 155 (colour fig.); Addison & Tindall, 1990: 47 (colour fig.; habits); Burgess et al., 1991: 207 (colour fig.); Chater et al., 1993: 7 (list); Gill, 1993: 44 (colour fig.; distribution; comparison with *P. aldabraensis*); Masuda & Allen, 1993: 130, fig. F (colour fig.); Debelius, 1993: 112 (colour fig.; habitat and distribution); Lieske & Myers, 1994: pl. 31, fig. 8 (colour fig.; habitat and distribution); Smale et al., 1995: 110, pl. 64, fig. B (otolith morphology; geographical distribution in part); Debelius, 1996: 112 (colour fig.; habitat and distribution).

DIAGNOSIS: *Pseudochromis dutoiti* is distinguished from congeners in having, in combination, the sensory pores of the upper part of head surrounded by prominent dark grey to black spots, and 29-34 anterior lateral-line scales.

DESCRIPTION (based on 27 specimens, 28.4-68.5 mm SL): dorsal-fin rays III,29-32, last 12-15 segmented rays branched; anal-fin rays III,18-20, last 14-20 segmented rays branched; pectoral-fin rays 15-19; upper procurrent caudal-fin rays 6-9; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 29-33; scales in lateral series 41-47; anterior lateral-line scales 29-34; anterior lateral line terminating beneath segmented dorsal-fin ray 17-23; posterior lateral-line seales 4-10 + 0-1; scales between lateral lines 4-5; horizontal scale rows above anal-fin origin 12-16 + 1 + 2-4 = 16-20; circumpeduncular scales 19-20; predorsal scales 20-28; scales behind eye 3-5; scales to preopercular angle 5-6; gill rakers 4-6 + 11-13 = 15-18; pseudobranch filaments 7-11; circumorbital pores 20-76; preopercular pores 11-30; dentary pores 4; posterior interorbital pores 1-5.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although often with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of posterior AIO pores to anterior AIO pores; opercle with 3-10 usually relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed on raker tips only, although often with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1 + 1/1/1 + 1*/1; dorsal-fin spines moderately stout to stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1 + 1*/1; anal-fin spines moderately stout to stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout to stout and pungent; second segmented pelvic-fin ray usually longest, although sometimes subequal to third; caudal fin rounded, sometimes with posterior margin of fin weakly rounded to truncate, often with lower lobe produced; vertebrae 10 + 16; epineurals 16-18; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 15 specimens, 28.4-66.4 mm SL): head length 19.9-26.4; orbit diameter 6.4-9.6; snout length 4.5-6.3; fleshy interorbital width 4.2-5.8; bony interorbital width 2.8-3.9; body width 7.8-11.3; snout tip to posterior tip of retroarticular bone 11.7-13.9; predorsal length 27.1-33.5; prepelvic length 27.3-31.6; posterior tip of retroarticular bone to pelvic-fin origin 16.5-21.9; dorsal-fin origin to pelvic-fin origin 20.4-25.0; dorsal-fin origin to middle dorsal-fin ray 33.9-39.2; dorsal-fin origin to anal-fin origin 35.6-41.2; pelvic-fin origin to anal-fin origin 26.7-33.1; middle dorsal-fin ray to dorsal-fin termination 24.6-31.3; middle dorsal-fin ray to anal-fin origin 18.6-23.5; anal-fin origin to dorsal-fin termination 34.9-39.3; anal-fin base length 29.5-34.3; dorsal-fin termination to anal-fin termination 11.3-14.9; dorsal-fin termination to caudal peduncle dorsal edge 7.1-9.8; dorsal-fin termination to caudal peduncle ventral edge 14.2-17.1; anal-fin termination to caudal peduncle dorsal edge 16.0-18.3; anal-fin termination to caudal peduncle ventral edge 9.0-11.2; first dorsal-fin spine 1.7-2.5; second dorsal-fin spine 2.9-4.9; third dorsal-fin spine 4.7-8.3; first segmented dorsal-fin ray 7.7-10.6; fourth last segmented dorsal-fin ray 12.4-14.8; first anal-fin spine 1.4-2.6; second anal-fin spine 2.7-6.3; third anal-fin spine 4.1-6.0; first segmented anal-fin ray 6.3-8.8; fourth last segmented anal-fin ray 10.9-13.2; third pectoral-fin ray 10.8-15.1; pelvic-fin spine 5.6-10.2; second segmented pelvic-fin ray 12.5-16.5; caudal-fin length 21.0-24.8.

Live coloration (based on photographs of specimens from Natal and Kenya; Plate 6B): head dark grey, sometimes becoming greyish orange ventrally; opercular flap with large dark grey to black spot, this edged posteriorly with gold; bright blue stripe extending from snout tip above eye and along anterior lateral line to upper edge of caudal peduncle; second blue stripe extending from middle of lower lip beneath eye to posterior edge of operculum immediately below gold-edged dark opercular flap spot; lower part of preopercle and operculum edged with irregular bright blue markings; upper infraorbital, posterior otic, upper preopercular, lower supratemporal and posttemporal pores surrounded by dark grey to black pigmentation; body brown, becoming yellowish brown to orange-yellow ventrally and posteriorly; area around pectoral-fin base with irregular bright blue markings; dorsal fin dark grey to black, becoming reddish brown to bright orange-red posteriorly; base of fin with series of bright blue oval spots; dark grey portion of fin with two rows of vertically elongate black spots; distal margin of fin bright blue; anal fin yellowish

brown to olive with bright blue distal margin; caudal fin reddish brown to orange-red basally, becoming dark grey posteriorly, fin rays dark grey to black; upper and lower lobes of caudal fin each with broad bright blue oblique subdistal stripe, these followed distally by black stripe and bright blue marginal stripe, proximal bright blue stripes sometimes converging on posterior edge of fin; pectoral fins hyaline; pelvic fins pale yellow orange to bright orange.

Preserved coloration: pattern similar to live coloration, head and body becoming yellow-brown to brown; black blotch on opercular flap and black head pore pigmentation remain; bright blue markings on head, body and fins becoming pale to dusky grey; dorsal and anal fins becoming brown to dark grey, black spots on dorsal fin becoming dark grey to black; caudal fin becoming pale brown to brown with broad, oblique dark brown to black submarginal stripe on each lobe; pectoral fins hyaline; pelvic fins becoming pale brown.

HABITAT AND DISTRIBUTION: *Pseudochromis dutoiti* is known only from the east coast of Africa, from Shimoni, Kenya south to Durban, South Africa (Figure 25). Records of this species from Aldabra Id and the north-west Indian Ocean are shown here to be based on the closely related *P. aldabraensis*. In addition, the specimens that formed the basis of Lubbock's (1977: 5) record of *P. dutoiti* from Madagascar (MNHN 1965.225) are here identified to *P. tauberae*. *Pseudochromis dutoiti* has been observed (Lubbock, 1977: 5) and collected from tidal pools and rock and coral reefs at depths ranging to 15 m.

COMPARISONS: *Pseudochromis dutoiti* is very similar in morphology to *P. aldabraensis*, with which it has been confused. Features distinguishing these two species are discussed under *Comparisons* for *P. aldabraensis*. It also resembles *P. springeri* from the Red Sea in having in life a combination of a gold-edged dark grey to black spot on the opercular flap, two bright blue stripes on the head, and black pigmentation surrounding some of the sensory pores of the head. It is readily distinguished from that species in having smaller scales (scales in lateral series 41-47, anterior lateral line scales 29-34 versus 35-42 and 15-25, respectively), and more cephalic sensory pores (circumorbital pores 20-76, preopercular pores 11-30 versus 12-15 and 7-10). In addition, the two species differ markedly in size (largest specimen examined 68.5 versus 37.5 mm SL), and in other live and preserved coloration details.

REMARKS: *Pseudochromis dutoiti* is a moderately large species; the largest specimen examined measured 68.5 mm SL. Live colour illustrations are provided in Lubbock (1977), Smith (1986), Allen & Steene (1987), Burgess et al. (1988, 1991), Gill (1993), Masuda & Allen (1993) and Debelius (1993, 1996).

ETYMOLOGY: The specific epithet is for Dr P.J. du Toit, former president of the South African Council for Scientific and Industrial Research.

MATERIAL EXAMINED: KENYA: Shimoni, BMNH 1974.2.12.4, 1(1), 28.4 mm SL, BMNH 1974.6.3.1, 1(1), 64.1 mm SL. MOZAMBIQUE: Bazaruto Id, RUSI 164, 1(1), 53.1 mm SL (holotype), RUSI 795, 1(1), 59.1 mm SL (paratype), SMF 9503, 1(1), 59.8 mm SL (paratype); Inhaca Id, RUSI 1847, 1(1), 68.5 mm SL. SOUTH AFRICA: Sodwana Bay, BPBM 21725, 4(4), 38.6-44.2 mm SL, RUSI 77-21, 10(10), 36.0-48.0 mm SL (36.6 mm SL specimen subsequently cleared and stained), WAM

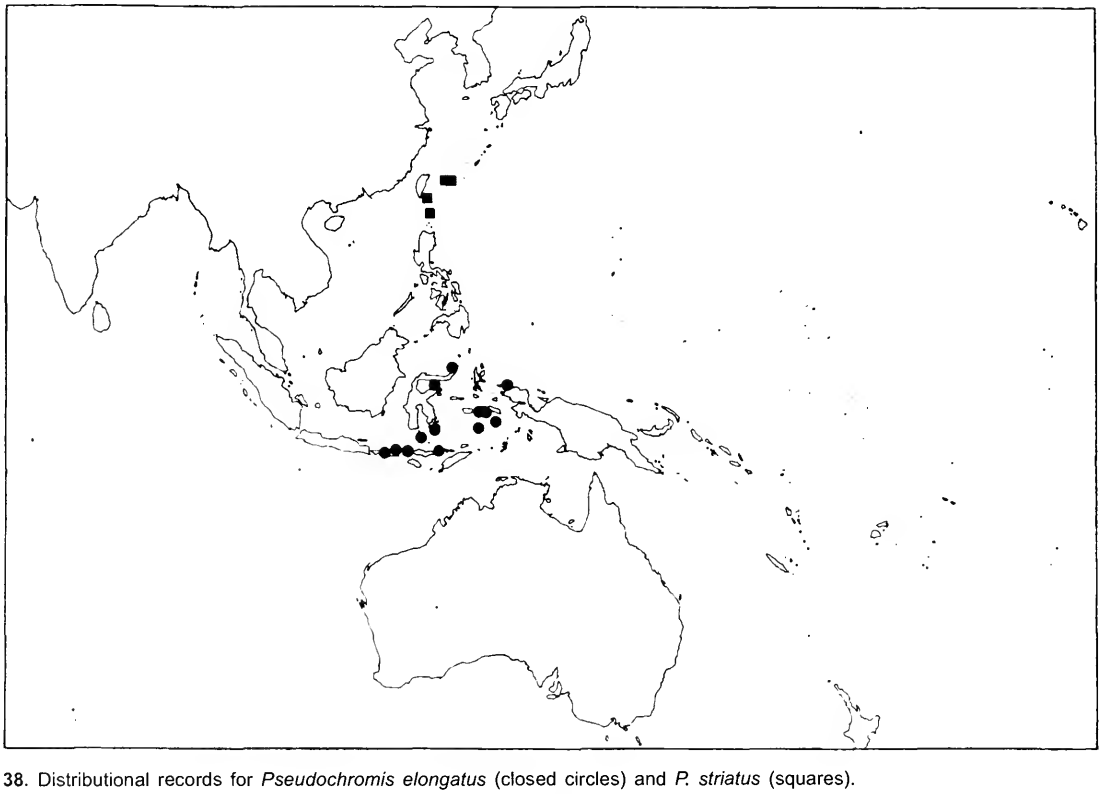

Figure 38. Distributional records for *Pseudochromis elongatus* (closed circles) and *P. striatus* (squares).

P.26527-007, 3(3), 57.8-66.2 mm SL; Durban, RUSI 3627, 3(3), 64.2-67.1 mm SL, RUSI 3629, 1(1), 45.3 mm SL.

***Pseudochromis elongatus* Lubbock**
Yellow-headed Dottyback
Figure 38; Plates 6C-E

Pseudochromis elongatus Lubbock, 1980: 826, fig. 3 (type locality: Ambon Id, Molucca Ids, Indonesia); Gill, 1993: 48 (colour fig.; habitat and distribution); Gill et al., 1995: 81, fig. 2 (comparison with *P. striatus*; colour fig.); Gill, 1999b: 2565 (key).

DIAGNOSIS: *Pseudochromis elongatus* is distinguished from congeners in having the following character combination: segmented dorsal-fin rays 25-27 (rarely 25 or 27) with last 2-9 rays branched; segmented anal-fin rays 14-15 (rarely 14); circumpeduncular scales 16; horizontal scale rows above anal-fin origin 11-13 + 1 + 2-3 = 14-16; and a slender body (dorsal-fin origin to pelvic-fin origin 21.9-25.3 % SL). In combination, the presence of a dark grey to black sub-basal ovoid mark on the caudal fin and absence of dark stripes on the sides of the body is also diagnostic for the species.

DESCRIPTION (based on 23 specimens, 20.0-41.6 mm SL): dorsal-fin rays III,25-27, last 2-9 segmented rays branched; anal-fin rays III,14-15, last 2-13 segmented rays branched; pectoral-fin rays 16-18; upper procurrent caudal-fin rays 6-8; lower procurrent caudal-fin rays 5-7; total caudal-fin rays 28-32; scales in lateral series 35-40; anterior lateral-line scales 22-29; anterior lateral line terminating beneath segmented dorsal-fin ray 13-19; posterior lateral-line scales 0-8 + 0-2; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 11-13 + 1 + 2-3 = 14-16; circumpeduncular scales 16; predorsal scales 13-20; scales behind eye 1-3; scales to preopercular angle 3-5; gill rakers 4-6 + 10-13 = 14-18; pseudobranch filaments 6-8; circumorbital pores 13-21; preopercular pores 6-11; dentary pores 4-5; posterior interorbital pores 1-3.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of anterior AIO pores to posterior nasal pores; opercle with 3-5, usually relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed mainly on raker tips only, although sometimes with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1 + 1*/1; dorsal-fin spines moderately slender to stout and pungent; anterior anal-fin pterygiophore formula 3/1/1 + 1/1/1 + 1/1; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine moderately slender and pungent; second segmented pelvic-fin ray usually longest, although sometimes subequal to third; caudal fin rounded, usually with posterior margin truncate, often in combination with prolongation of outer principal rays to give lyre-like shape; vertebrae 10 + 16; epineurals 13-14; epurals 3.

Upper jaw with 3-5 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw slightly larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of the tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 17 specimens, 23.4-41.6 mm SL): head length 21.9-27.1; orbit diameter 8.2-11.1; snout length 4.7-6.7; fleshy interorbital width 4.9-6.0; bony interorbital width 3.5-4.0; body width 10.4-12.5; snout tip to posterior tip of retroarticular bone 11.5-14.1; predorsal length 29.5-34.6; prepelvic length 29.7-33.3; posterior tip of retroarticular bone to pelvic-fin origin 18.3-20.4; dorsal-fin origin to pelvic-fin origin 21.9-25.3; dorsal-fin origin to middle dorsal-fin ray 31.6-35.5; dorsal-fin origin to anal-fin origin 36.3-41.5; pelvic-fin origin to anal-fin origin 29.0-32.8; middle dorsal-fin ray to dorsal-fin termination 24.2-28.1; middle dorsal-fin ray to anal-fin origin 19.9-24.5; anal-fin origin to dorsal-fin termination 31.4-35.3; anal-fin base length 25.0-29.8; dorsal-fin termination to anal-fin termination 12.5-15.1; dorsal-fin termination to caudal peduncle dorsal edge 10.7-11.9; dorsal-fin termination to caudal peduncle ventral edge 16.0-19.7; anal-fin termination to caudal peduncle dorsal edge 17.3-20.8; anal-fin termination to caudal peduncle ventral edge 11.1-15.0; first dorsal-fin spine 0.8-1.9; second dorsal-fin spine 3.4-4.7; third dorsal-fin spine 5.3-8.3; first segmented dorsal-fin ray 10.5-13.4; fourth last segmented dorsal-fin ray 13.2-19.5; first anal-fin spine 1.4-2.8; second anal-fin spine 4.3-6.5; third anal-fin spine 4.8-7.4; first segmented anal-fin ray 8.8-11.1; fourth last segmented anal-fin ray 12.7-21.0; third pectoral-fin ray 10.8-15.0; pelvic-fin spine 7.9-10.7; second segmented pelvic-fin ray 17.3-20.8; caudal-fin length 21.4-27.8.

Live coloration (based on photographs of specimens from Batuatu Id, Bonerate Id, Togian Ids and N of Sorong, Indonesia; Plates 6C-E): head and body either brown, becoming pinkish brown on head and ventrally on abdomen, or dark purplish or bluish grey, sometimes becoming pale pink ventrally on abdomen; upper part of head, lips and sometimes lower part of head abruptly yellowish grey to bright yellow to bright orange or bright red; midposterior edge of orbital rim dark grey to black, with pale blue line extending from dark grey to black marking along ventral orbital rim to middle of upper lip; orbital rim in front of blue line yellowish grey to bright orange; mid-basal portion of operculum sometimes with several short reddish brown horizontal lines; iris yellowish brown to bright yellow with blue suboval ring around pupil; scales of brown or dark purplish to bluish grey portion of body darker basally; dorsal fin either reddish brown to bright pinkish red basally and pinkish hyaline to hyaline distally with dark grey distal margin, sometimes with dark purplish grey stripe through reddish brown to bright pinkish red area, or purplish grey, becoming greyish hyaline distally, with narrow pale pink basal stripe and bright yellow to bright orange-red subdistal stripe, purplish grey to greyish hyaline portion of fin with five or six oblique rows of dark grey spots; anal fin either pinkish hyaline to hyaline with grey distal margin, or purplish grey, becoming

greyish hyaline distally, with narrow pale pink basal stripe and bright yellow subdistal stripe; caudal fin with basal two-thirds orange-brown to purplish grey, posterior third abruptly dark grey to black; orange-brown to purplish grey and dark grey to black regions of caudal fins sometimes separated by broad bright orange bar; subdistal margin of caudal fin bright yellow to bright orange-red, this bordered broadly by hyaline distal margin; pectoral fins pinkish to yellowish hyaline; pelvic fins pinkish or yellowish hyaline to grey.

Preserved coloration: body pale brown to brown; head and nape pale yellow to pale brown; short dark grey to black streak behind eye; body scales slightly dusky basally; dorsal fin either hyaline to pale with dark grey basal stripe, or dark brown, pale to hyaline anteriorly and distally, with dark grey oblique stripe extending from base of first spine to middle of second or third segmented ray; anal fin dark brown, pale to hyaline distally; caudal fin with basal two-thirds brown and posterior third dark grey to black; upper and lower distal margins broadly whitish to hyaline; posterior margin of fin narrowly whitish to hyaline; pectoral and pelvic fins hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis elongatus* was previously known only from the Molucca Ids in Indonesia. Its range is here extended to include several additional eastern Indonesian localities (Figure 38). Records from the Togian Ids (Sulawesi), Komodo Id, and an island 135 km north of Sorong, Irian Jaya, are based on underwater photographs by R.H. Kuiter, J.E. Randall and G. Barrall, respectively. *Pseudochromis elongatus* has been collected from rock rubble, around coral and sponges, and in small caves on reef slopes and dropoffs at depths ranging from 3 to 42 m.

COMPARISONS: This species closely resembles *P. striatus* in having 25-27 (usually 26) segmented dorsal-fin rays with the last 2-9 rays unbranched, 14-15 (usually 15) segmented anal-fin rays, 16 circumpeduncular scales, a slender body (dorsal-fin origin to pelvic-fin origin 21.9-25.3 % SL), and a sub-basal dark grey to black ovoid mark on the caudal fin. It differs from *P. striatus* in having more horizontal scale rows above the anal-fin origin (11-13 + 1 + 2-3 = 14-16 versus 9-10 + 1 + 1-2 = 11-13), and a more-or-less uniform pale body coloration (versus pale with five to nine dark stripes).

REMARKS: *Pseudochromis elongatus* is a small species; the largest specimen examined measured 41.6 mm SL. Live colour photographs of the species are provided by Gill (1993) and Gill et al. (1995).

ETYMOLOGY: The specific epithet is from the Latin for prolonged, and alludes to the relatively slender body of this species.

MATERIAL EXAMINED: INDONESIA: Sulawesi, SE side of Manadotua Id, BPBM 26689, 1(0), 19.0 mm SL; Molucca Ids, Ceram, just W of Tandjung Namatatuni, USNM 210020, 3(0), 23.5-27.6 mm SL (paratypes); Molucca Ids, Ambon Id, 2 km E of Sawa Telu, USNM 210273, 1(1), 36.2 mm SL (holotype); Molucca Ids, Saparua Id, AMS I.20172-001, 1(1), 31.4 mm SL (paratype); Molucca Ids, Saparua Id, off Kampunghamu, USNM 210135, 4(0), 20.1-32.3 mm SL (paratypes); Kepulauan Banda, Roen Id, USNM 246212, 6(4, 25.6-35.3 mm SL), 17.0-35.3 mm SL (32.3 mm SL specimen subsequently cleared and stained); Kepulauan Banda, just W of N tip of Great Banda Id, USNM 290784, 6(0); Kepulauan Banda, Groote Banda, USNM 246219, 1(0); Kepulauan Banda, southern shore of Goenoeng Api Id, USNM 290416, 1(0); Batuata Id, BPBM 31494, 5(5), 20.0-26.9 mm SL; Bonerate Ids, Telerang Islet, BPBM 31527, 1(1), 31.8 mm SL; Bonerate Ids, Kakavia Id, CAS 59557, 2(2), 35.8-38.6 mm SL, BPBM 31501, 2(2), 39.5-41.6 mm SL; Bonerate Id, CAS 62467, 1(1), 25.3 mm SL; Banda Sea, Penyu Id, CAS 62534, 5(5), 23.4-33.8 mm SL; Banda Sea, Bingkuda Id, CAS 59524, 2(0), 24.1-44.7 mm SL; Lombok, Gili Air, BPBM 30164, 1(0), 28.0 mm SL; Sumbawa, Moyo Id, CAS 62453, 1(1), 24.0 mm SL; Flores, Waipare Reef, BPBM 32220, 1(0), 25.5 mm SL.

Pseudochromis flammicauda Lubbock & Goldman

Firetail Dottyback

Figure 39; Plates 6F-G

Pseudochromis flammicauda Lubbock & Goldman, 1976: 57, fig. 1 (type locality: One Tree Id, Great Barrier Reef, Australia); Russell, 1983: 44 (list); Debelius, 1984b: 426 (colour fig.); Debelius, 1986: 21 (colour fig.); Burgess et al., 1988: pl. 154 (colour fig.); Paxton et al., 1989: 519 (list; distribution); Gill, 1990b: 128 (deseription; distribution; colour fig.); Burgess et al., 1991: 206 (colour fig.); Kuiter, 1992: 42, fig. c (colour fig.; habitat and distribution); Gill, 1993: 44 (sexual dimorphism; distribution); Lieske & Myers, 1994: pl. 32, fig. 8 (colour fig.; habitat and distribution); Gill, 1997: 128 (description; distribution; sexual dimorphism; colour fig.); Gill, 1999b: 2564 (key).

DIAGNOSIS: *Pseudochromis flammicauda* is distinguished from other members of the genus in having the following combination of characters: segmented dorsal-fin rays 23-25 (usually 24); segmented anal-fin rays 13-14 (usually 14); scales in lateral series 36-40; circumpeduncular scales 17-20 (usually 20); dorsal and anal fins without well-developed scales sheaths; and anal- fin spines weakly developed (slender and weakly pungent to flexible with the second spine about as stout as the third).

DESCRIPTION (based on 45 specimens, 20.6-43.4 mm SL): dorsal-fin rays III,23-25, last 15-25 segmented rays branched (all or all but first branched in specimens larger than 22 mm SL); anal-fin rays III,13-14, all or all but first segmented rays branched; pectoral-fin rays 17-19; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 5-7; total caudal-fin rays 28-31; scales in lateral series 36-40; anterior lateral-line scales 24-30; anterior lateral line terminating beneath segmented dorsal-fin ray 14-19; posterior lateral-line scales 4-10 + 0; scales between lateral lines 3-5; horizontal scale rows above anal-fin origin 12-15 + 1 + 2-4 = 15-19; circumpeduncular scales 17-20; predorsal scales 15-21; scales behind eye 2-3; scales to preopercular angle 3-5; gill rakers 4-6 + 10-12 = 14-18; pseudobranch filaments 6-9; circumorbital pores 14-20; preopercular pores 7-13; dentary pores 4; posterior interorbital pores 1.

Lower lip usually complete, although sometimes with weak symphyseal interruption; dorsal and anal fins without scale

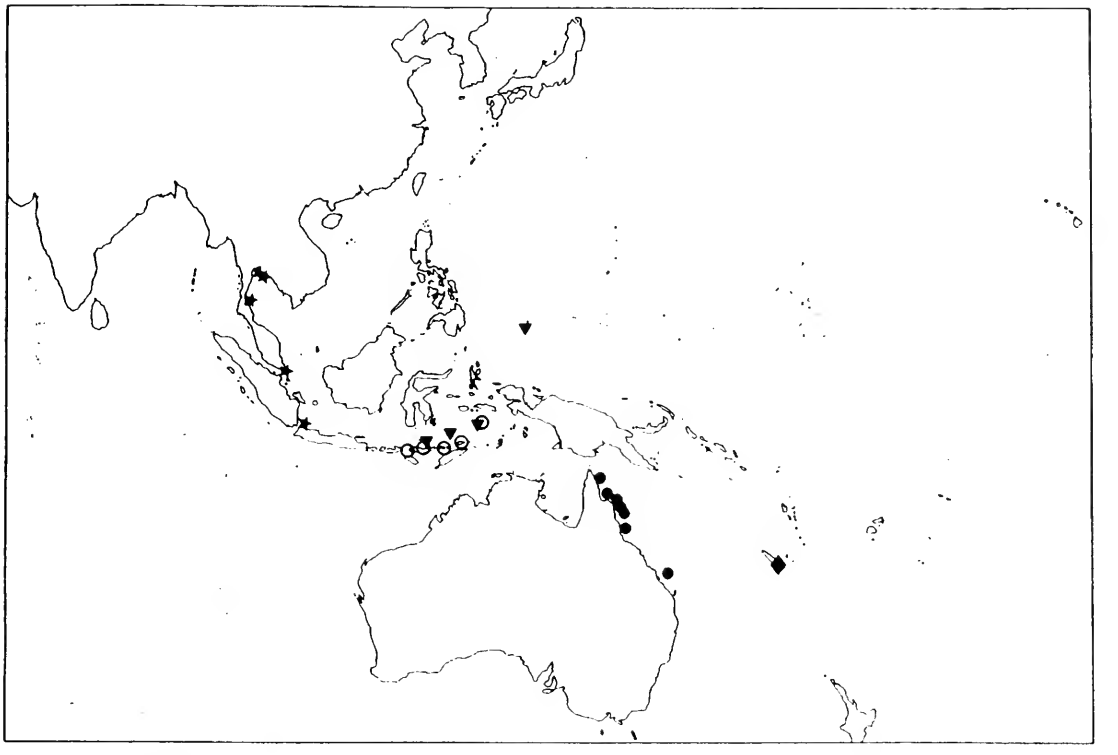

Figure 39. Distributional records for *Pseudochromis flammicauda* (closed circles), *P. kolythrus* (diamond), *P. litus* (open circles), *P. pylei* (triangles) and *P. ransonneti* (stars).

sheaths, although intermittent scales may overlap fin bases; predorsal scales extending anteriorly to point ranging from vicinity of anterior AIO pores to posterior nostrils; opercle with 3-9 small, usually indistinct serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or with well-developed teeth confined to raker tips; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1 + 1/1/1 + 1*; dorsal-fin spines slender, tips weakly pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1/1 + 1*; anal-fin spines slender and weakly pungent to flexible, second spine about as stout as third; pelvic-fin spine slender, tip weakly pungent to flexible; second segmented pelvic-fin ray longest; caudal fin rounded, posterior margin often weakly rounded to truncate; vertebrae 10+16; epineurals 12-13; epurals 3.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 19 specimens, 22.0-43.4 mm SL): head length 23.9-29.9; orbit diameter 8.2-11.4; snout length 4.8-6.9; fleshy interorbital width 4.2-5.3; bony interorbital width 2.7-3.5; body width 11.4-13.6; snout tip to posterior tip of retroarticular bone 12.6-15.9; predorsal length 34.0-38.9; prepelvic length 30.9-36.7; posterior tip of retroarticular bone to pelvic-fin origin 19.1-21.7; dorsal-fin origin to pelvic-fin origin 26.2-30.1; dorsal-fin origin to middle dorsal-fin ray 28.3-34.5; dorsal-fin origin to anal-fin origin 38.5-41.8; pelvic-fin origin to anal-fin origin 25.3-33.0; middle dorsal-fin ray to dorsal-fin termination 22.1-24.7; middle dorsal-fin ray to anal-fin origin 24.1-28.0; anal-fin origin to dorsal-fin termination 29.4-33.1; anal-fin base length 22.1-25.9; dorsal-fin termination to anal-fin termination 14.0-19.8; dorsal-fin termination to caudal peduncle dorsal edge 12.3-15.0; dorsal-fin termination to caudal peduncle ventral edge 18.5-21.2; anal-fin termination to caudal peduncle dorsal edge 20.3-23.9; anal-fin termination to caudal peduncle ventral edge 14.1-19.1; first dorsal-fin spine 0.9-1.8; second dorsal-fin spine 3.0-4.0; third dorsal-fin spine 4.9-6.6; first segmented dorsal-fin ray 9.6-12.4; fourth last segmented dorsal-fin ray 13.6-16.9; first anal-fin spine 0.3-1.7; second anal-fin spine 2.3-3.3; third anal-fin spine 5.1-6.8; first segmented anal-fin ray 9.5-11.6; fourth last segmented anal-fin ray 13.6-16.0; third pectoral-fin ray 14.0-17.8; pelvic-fin spine 8.6-11.4; second segmented pelvic-fin ray 17.3-21.9; caudal-fin length 20.7-23.5.

Live coloration: Females (based on photographs of specimens from Lizard Id, Great Barrier Reef; Plate 6F): head and body dark grey-brown, paler ventrally; iris pale yellow with blue suboval ring around pupil; basal portion of dorsal fin dark grey, remainder of fin dusky hyaline to hyaline; anal fin greyish hyaline to dark grey basally, remainder of fin dusky hyaline to hyaline; basal two-thirds of caudal fin grey to bright yellow, remainder of fin greyish to yellowish hyaline; pectoral

fins hyaline; pelvic fins hyaline, sometimes grey basally. Males (based on photographs of specimens from Lizard Id, Great Barrier Reef; Plate 6G): head and body anterior to vertical to oblique line passing through pectoral-fin base pale pinkish yellow to bright orange-yellow; iris orange to bright red with blue suboval ring around pupil; remainder of body dark blue to dark grey, with triangular expansion of this coloration onto base of caudal fin; upper and lower edges of posterior part of caudal peduncle bright orange-yellow; basal half of dorsal fin dark blue to dark grey, remainder of fin bluish hyaline to hyaline; dorsal fin with two narrow pink to orange-red stripes, one passing through middle and other along distal edge of dark basal portion of fin; basal part of anal fin blue to dark grey, remainder of fin pinkish or bluish hyaline to hyaline, two areas separated by pink to bright red stripe; caudal fin where adjacent to triangular dark blue to dark grey basal mark bright orange-yellow to bright orange, remainder of fin bright yellow, becoming yellowish hyaline posteriorly; pectoral fins pinkish hyaline to hyaline; pelvic fins pale pink to pinkish hyaline.

Preserved coloration: Juveniles and females: pattern similar to live coloration, head and body becoming brown, paler ventrally; dorsal and anal fins becoming hyaline to brownish hyaline, usually dusky basally and hyaline distally; caudal fin pale brown to brown basally, becoming brownish hyaline to hyaline on posterior third of fin; pectoral and pelvic fins hyaline. Males: pattern similar to live coloration, pinkish yellow to orange-yellow areas on head, body and caudal fin becoming pale yellowish brown; dark blue to dark grey areas on body and caudal fin becoming brown to dark grey-brown; dorsal and anal fins brownish grey basally, hyaline to dusky hyaline distally; pectoral and pelvic fins hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis flammicauda* is known only from the Great Barrier Reef of Australia, from Sir Charles Hardy Id, Cape York south to One Tree Id in the Capricorn Group (Figure 39). It has been collected from rock and coral reefs in lagoons and on reef slopes at depths ranging from 2 to 25 m.

COMPARISONS: This species is relatively distinct in usually having 24 segmented dorsal-fin rays, 14 segmented anal-fin rays, 20 circumpeduncular scales, and relatively weak anal-fin spines (slender and weakly pungent to flexible with the second about as stout as the third). The only other pseudochromine with a similar combination of characters is *P. magnificus*, but it differs in having well-developed scales sheaths on the dorsal and anal fins (absent in *P. flammicauda*), more scales in lateral series (40-44 versus 36-40), and more anterior lateral-line scales (30-36 versus 24-30).

REMARKS: *Pseudochromis flammicauda* is a small species; the largest specimen examined measured 43.4 mm SL. Colour photographs of males of the species are provided by Debelius (1984b, 1986), Burgess et al. (1988, 1991), Gill (1990b, 1997) and Kuiter (1992). The above sexual dimorphism is from a superficial examination of gonads of museum specimens. The species may be a protogynous hermaphrodite, as juveniles exhibit the female coloration, and several males had ovarian tissue lying dorsal to the testes. Some of the apparent hermaphroditic specimens had colour patterns intermediate between the male and female forms.

ETYMOLOGY: The specific epithet is a noun in apposition derived from the Latin *flammeus*, fiery red, and *cauda*, tail, with reference to the bright red caudal fin of the male of the species.

MATERIAL EXAMINED: GREAT BARRIER REEF, AUSTRALIA: Sir Charles Hardy Ids, South Id, AMS I.20770-116, 1(1), 38.2 mm SL; Cape York, Haggerstone Id, AMS I.20937-018, 1(1), 39.7 mm SL; Cape York, Clack Id, AMS I.20793-024, 4(4), 30.5-39.0 mm SL; off Cape Melville, AMS I.20774-135, 5(5), 26.2-35.5 mm SL; Lizard Id, AMS I.21540-045, 3(3), 27.7-35.5 mm SL (cleared and stained), AMS I.18755-027, 6(3, 24.1-35.3 mm SL), 23.5-35.3 mm SL, AMS I.19108-042, 9(6, 25.3-31.8 mm SL), 13.0-35.0 mm SL, AMS I.19473-101, 18(0), 15.0-40.0, AMS I.19473-228, 2(2), 38.2-38.9 mm SL (cleared and stained), AMS I.19482-053, 7(2, 22.6-36.0 mm SL), 12.0-36.0 mm SL, AMS I.23708-022, 2(2), 34.9-36.8 mm SL; Spur Reef, AMS I.17045-002, 1(1), 37.5 mm SL (paratype); Escape Reef, AMS I.22575-035, I(I), 28.6 mm SL, AMS I.22579-050, 2(2), 31.1-31.9 mm SL, AMS I.22637-025, 2(2), 30.8-32.0 mm SL; Endeavour Reef, ANSP, 167779, 3(0); NE of Dunk Id, AMS I.20965-032, 6(6), 20.6-33.9 mm SL; Capricorn Group, Heron Id, AMS I.15486-036, 1(1), 43.4 mm SL (paratype); Capricorn Group, One Tree Id, AMS I.17445-001, I(1), 42.7 mm SL (holotype), AMS I.17445-155, 1(1), 30.5 mm SL, BMNH 1975.2.12.3, 1(1), 36.2 mm SL (paratype).

***Pseudochromis flavivertex* Rüppell**

Sunrise Dottyback

Figure 40; Plates 6H-J, 7A

Pseudochromis flavivertex Rüppell, 1835: 9, pl. 2, fig. 4 (type locality: Massaua, Red Sea); Günther, 1860: 258 (description; Red Sea); Klunzinger, 1871: 518 (compilation); Botros, 1971: 315 (list); Lubbock, 1975: 134, pl. 1, fig. c (description; distribution; lectotype designation); Randall, 1983: 58 (description and colour fig.); Debelius, 1984a: 119 (colour fig.); Debelius, 1984b: 428 (colour fig.); Debelius, 1986: 17 (colour fig.); Allen & Steene, 1987: pl. 32, fig. 2 (Jeddah, Red Sea); Burgess et al., 1988: pl. 155 (colour fig.); Giovanetti, 1989: 75 (aquarium notes; colour fig.); Michael, 1990a: 9 (colour fig.; aquarium notes); Aramata, 1990: 90 (colour fig. after Rüppell, 1835); Burgess et al., 1991: 208 (colour fig.); Baensch & Debelius, 1992: 972 (colour figs; not sexual dimorphism); Fosså & Nilsen, 1993: 131 (colour fig.; habitat and distribution; aquarium notes); Masuda & Allen, 1993: 130, fig. E (colour fig.); Debelius, 1993: 112 (colour figs; habitat and distribution); Goren & Dor, 1994: 28 (list); Lieske & Myers, 1994: pl. 31, fig. 5 (colour fig.; habitat; distribution in part); Göthel, 1994: 105 (colour fig.; habitat & distribution); Debelius, 1996: 112 (colour figs; habitat and distribution); Shpigel, 1997: 66 (colour fig.; habitat and distribution; biological notes); Field & Field, 1998: 77 (colour fig.); Debelius, 1998: 67 (colour figs; habitat).

Pseudochromis (Pseudochromis) flavivertex; Fowler, 1931b: 37 (compilation).

DIAGNOSIS: *Pseudochromis flavivertex* is distinguished from congeners in having the following combination of characters:

segmented dorsal-fin rays 25-28 (usually 26-27); segmented anal-fin rays 14-16 (usually 14-15); scales in lateral series 39-46 (usually 41-45); gill rakers 5-7 + 11-15 = 17-22 (usually 6-7 + 13-15 = 19-21); circumpeduncular scales 19-20; predorsal scales 16-22; well-developed teeth on ceratobranchial-1 outer rakers running most of raker lengths; dorsal and anal fins without scale sheaths; a moderately slender body (dorsal-fin origin to pelvic-fin origin 25.7-30.7 % SL); and a relatively long caudal peduncle (anal-fin termination to caudal peduncle ventral edge 12.7-15.3 % SL).

DESCRIPTION (based on 34 specimens, 23.4-63.8 mm SL): dorsal-fin rays III,25-28, last 5-27 segmented rays branched (all or all but first 1-2 branched in specimens larger than about 35 mm SL); anal-fin rays III,14-16, last 6-15 segmented rays branched (all or all but first 1-2 branched in specimens larger than about 30 mm SL); pectoral-fin rays 16-18; upper procurrent caudal-fin rays 5-8; lower procurrent caudal-fin rays 6-8; total caudal-fin rays 29-33; scales in lateral series 39-46; anterior lateral-line scales 23-33; anterior lateral line terminating beneath segmented dorsal-fin ray 13-20; posterior lateral-line scales 0-16 + 0-3; scales between lateral lines 4-6; horizontal scale rows above anal-fin origin 14-16 + 1 + 2-4 = 17-21; circumpeduncular scales 19-20; predorsal scales 16-22; scales behind eye 1-4; scales to preopercular angle 4-6; gill rakers 5-7 + 11-15 = 17-22; pseudobranch filaments 7-12; circumorbital pores 19-27; preopercular pores 10-18; dentary pores 4; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of posterior AIO pores to anterior AIO pores; opercle with 4-9 relatively well-developed serrations; teeth of outer ceratobranchial-1 gill rakers usually well developed and arranged in 2 rows running full length of rakers, but sometimes sparse or weakly developed in small (< 30 mm SL) specimens; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1 + 1*/1 or S/S/S + 3/1 + 1/1/1/1 + 1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1*/1; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine moderately stout to stout and pungent; second segmented pelvic-fin ray longest; caudal fin truncate to emarginate; vertebrae 10 + 16; epineurals 13-16; epurals 3.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw slightly larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 23 specimens, 28.4-63.8 mm SL): head length 20.7-28.5; orbit diameter 6.6-11.2; snout length 5.5-6.8; fleshy interorbital width 5.0-6.7; bony interorbital width 3.3-4.6; body width 10.2-14.4; snout tip to posterior tip of retroarticular bone 12.2-15.8; predorsal length 29.1-36.6; prepelvic length 29.5-34.3; posterior tip of retroarticular bone to pelvic-fin origin 17.3-21.6; dorsal-fin origin to pelvic-fin origin 25.7-30.7; dorsal-fin origin to middle dorsal-fin ray 29.9-36.8; dorsal-fin origin to anal-fin origin 40.2-44.1; pelvic-fin origin to anal-fin origin 26.4-34.3; middle dorsal-fin ray to dorsal-fin termination 22.8-28.7; middle dorsal-fin ray to anal-fin origin 25.6-29.1; anal-fin origin to dorsal-fin termination 32.2-38.4; anal-fin base length 24.3-30.7; dorsal-fin termination to anal-fin termination 14.6-18.0; dorsal-fin termination to caudal peduncle dorsal edge 10.4-14.6; dorsal-fin termination to caudal peduncle ventral edge 18.0-22.0; anal-fin termination to caudal peduncle dorsal edge 19.6-22.9; anal-fin termination to caudal peduncle ventral edge 12.7-15.3; first dorsal-fin spine 1.4-3.2; second dorsal-fin spine 3.6-6.3; third dorsal-fin spine 5.8-9.6; first segmented dorsal-fin ray 11.8-14.5; fourth last segmented dorsal-fin ray 14.6-17.8; first anal-fin spine 1.5-3.1; second anal-fin spine 3.2-7.5; third anal-fin spine 6.3-9.1; first segmented anal-fin ray 11.2-13.5; fourth last segmented anal-fin ray 13.1-18.3; third pectoral-fin ray 13.6-17.9; pelvic-fin spine 8.8-13.2; second segmented pelvic-fin ray 20.6-31.4; caudal-fin length 22.3-27.8.

Live coloration (based on field notes and photographs of specimens from the Gulf of Aqaba, Jiddah and Port Sudan and notes taken from captive specimens; Plates 6H-J, 7A): head and body either uniform yellowish brown to bright yellow, sometimes with small bluish area on flanks behind pectoral-fin base, or greyish blue to bright blue, sometimes becoming greyish yellow to bright yellow posteriorly, lower part of head and body either abruptly or gradually pale bluish grey to white; dorsal contour of head and body usually with narrow bright yellow to bright orange-yellow median stripe extending from snout tip to base of caudal fin, this sometimes present only on dorsal contour of caudal peduncle and posterior part of dorsal fin base; posteroventral rim of orbit bright yellow to bright orange-red, this bordered proximally with narrow pale blue or grey to bright blue curved line; iris yellowish grey to bright yellow with bright blue suboval ring around pupil; each scale of flanks within greyish blue to bright blue region usually with blue to dark blue central spot; dorsal fin either bright yellow to bright orange-yellow basally becoming bluish to bright yellowish hyaline distally, sometimes with bright blue distal margin ("yellow-topped" and xanthic specimens), or bluish grey to blue basally becoming yellowish hyaline distally with bright blue distal margin ("blue-topped" specimens); anal fin either pale grey to pale blue with blue distal margin ("yellow-topped" and "blue-topped" specimens), or bright yellow to yellowish hyaline (xanthic specimens); caudal fin bright yellow to bright orange-yellow, becoming yellowish hyaline posteriorly, usually with greyish blue to bright blue body coloration extending onto midbasal section, blue area sometimes extensive leaving only upper edge of fin yellow; pectoral fins bluish or yellowish hyaline to hyaline; pelvic fins bluish white to hyaline.

Preserved coloration: pattern similar to live coloration, greyish blue to bright blue areas on head and body becoming brown to dark brown; pale bluish grey to white areas becoming pale yellowish brown to pale grey; brownish yellow to bright orange-yellow areas becoming pale yellow to pale brown;

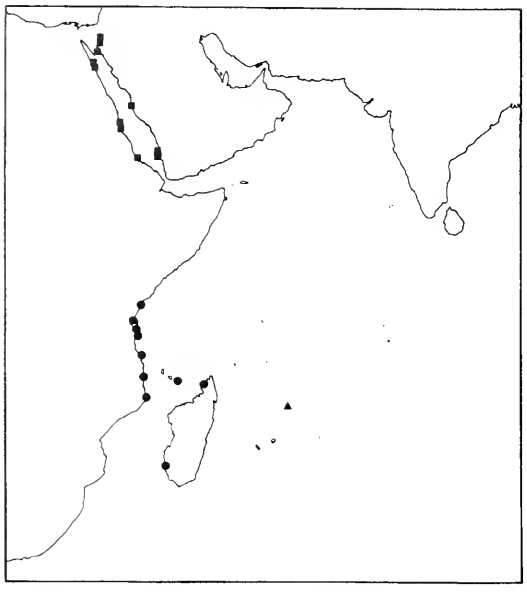

Figure 40. Distributional records for *Pseudochromis flavivertex* (squares), *P. magnificus* (triangle) and *P. tauberae* (closed circles).

opercular flap sometimes with indistinct to distinct dark brown spot; blue to dark blue spots on flank scales becoming dark brown; dorsal and anal fins pale brownish hyaline to hyaline, sometimes pale yellow to white basally, occasionally with three to six narrow brown oblique stripes on distal part of fins; greyish blue to bright blue areas on caudal fin becoming brown to dark brown, bright yellow to yellowish hyaline areas of fin becoming greyish white to brownish hyaline or hyaline; pectoral fins hyaline; pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis flavivertex* is known only from the Red Sea, from the Gulf of Aqaba south to the Kamaran Ids, Yemen, and to the vicinity of Massawa, Eritrea (Figure 40). Masuda & Allen (1993: 130; repeated in Lieske & Myers, 1994), Göthel (1994: 105) and Debelius (1998) also recorded the species from the Gulf of Aden, but did not indicate the basis for their records. *Pseudochromis flavivertex* has been colleeted from coral and rock reefs at depths ranging from 1 to 30 m.

COMPARISONS: This species is relatively distinet within the Pseudochrominae in having the following character combination: segmented dorsal-fin rays 25-28 (usually 26- 27); segmented anal-fin rays 14-16 (usually 14-15); scales in lateral series 39-46 (usually 41-45); gill rakers 5-7 + 11-15 = 17-22 (usually 6-7 + 13-15 = 19-21); circumpeduncular scales 19-20 (usually 20); predorsal scales 16-22; and well-developed teeth on outer ceratobranchial-1 gill rakers usually running most of raker lengths. The only pseudochromine with a similar combination of characters is *P. fuscus* from the west-Paeific and the eastern and central Indian Ocean. Furthermore, this variable species sometimes superficially resembles *P. flavivertex* in having a colour form that is bluish grey, with the dorsal body contour below the dorsal base bright yellow. *Pseudochromis flavivertex* differs from *P. fuscus* in lacking scale sheaths on the dorsal and anal fins (versus usually with weakly to well-developed scale sheaths present at least posteriorly on dorsal and anal fins), and in having several morphometric differences, including a shallower body (dorsal-fin origin to pelvic-fin origin 25.7-30.7 % SL versus 29.7-35.7 % SL), a shorter head (head length 21.5-28.5 % SL versus 25.3-30.6 % SL), a longer caudal peduncle (dorsal-fin termination to caudal peduncle dorsal edge 10.4-14.6 % SL and anal-fin termination to caudal peduncle ventral edge 12.7-15.3 % SL versus 7.8-10.5 % SL and 9.1-11.5 % SL, respectively), and a shorter predorsal length (predorsal length 29.1-36.6 % SL versus 33.8-39.5 % SL).

REMARKS: *Pseudochromis flavivertex* is a moderate-sized species; the largest specimen examined measured 63.8 mm SL. The typical "yellow-topped" form of this species has been illustrated by Lubbock (1975), Randall (1983), Debelius (1984a, 1984b, 1986, 1993, 1996, 1998), Allen & Steene (1987), Burgess et al. (1988; 1991), Giovanetti (1989), Michael (1990a), Baensch & Debelius (1992) Fosså & Nilsen (1993) and Göthel (1994). The "blue-topped" (Plate 6I) and xanthic (Plate 7A) forms have been illustrated by Baensch & Debelius (1992) and Debelius (1993, 1996). These forms are not geographically associated (all have been collected from throughout the Red Sea), nor are they related to sex or size of specimen (contrary to Baensch & Debelius, 1992, and Debelius, 1998). They are clearly conspecific; no differences were noted between the forms in either meristic or morphometric values, and several specimens with intermediate colourations were examined among collections from Massawa and Sharm Abhur.

Lubbock (1975) suggested that specimens from the southern part of the Red Sea differed from specimens from the central and northern Red Sea in having the median yellow stripe narrower and slightly more orange in coloration, the snout in large specimens slate blue (versus bright yellow), and the yellow portion of the caudal fin confined to the upper few rays. However, these differences were not apparent in the present study.

Lubbock (1975), Brons (1996) and Wilkerson (1997) documented captive spawning behaviour, and several commereial breeders are now breeding this species for the aquarium fish trade (Brons, 1996; Wilkerson, 1977).

ETYMOLOGY: The specific epithet is derived from the Latin *flavus*, yellow, and *vertex*, top, with referenee to the typical live eoloration of the species.

MATERIAL EXAMINED (all Red Sea): RED SEA: MNHN 1977-995, 1(1), 49.8 mm SL. GULF OF AQABA: SMF 16265, 3(0), SMF 16263, 2(0), SMF 16264, 1(0); Israel, bay at El Himira, USNM 211770, 16(9, 23.4-41.9 mm SL), 14.5-41.9 mm SL (25.9 and 38.7 mm SL specimens eleared and stained), USNM 278103, 1(0), USNM 278107, 1(0); Israel, Marsa el Muqebila, USNM 278098, 1(0); Israel, El Himira, BPBM 13390, 1(0), 41.0 mm SL; Israel, El Tur, USNM 278112, 1(0); N of Coral Id, BPBM 18221, 3(0), 23.0-44.0 mm SL; Jordan, BMNH 1973.12.20.73-74, 2(0), 42.1-52.3 mm SL; Jordan, Aqaba, SMF 14097, 1(0). SAUDI ARABIA: Tiran Id, Fowl Bay, SMF 20040, 5(5), 39.7-50.4 mm SL, SMF 20038, 3(0), SMF 20039 1(0); Sharm Abhur, BPBM 28374, 3(3), 40.6-56.7 mm SL; creek N of Jiddah (Jeddah), BPBM 30361, 1(0), 21.0 mm SL; Jiddah Harbour, BMNH 1973.12.20.91, 1(0), 50.0 mm SL, USNM 290340, 1(1), 43.0 mm SL, USNM 290599, 1(1), 32.1 mm SL; Farasan Ids, Amina Id, BMNH 1973.12.20.93,

1(0), 41.1 mm SL. EGYPT: Hurghada, USNM 278125, 2(0), USNM 278134, 1(0), USNM 278096, 1(0), SMF 19635, 1(0); Sha'b al Fanadir, USNM 278109, 2(0). SUDAN: Port Sudan, BMNH 1973.12.20.77-89, 13(0), 25.8-50.2 mm SL, BMNH 1973.12.20.75-76, 2(0), 39.8-50.1 mm SL; Suakin Harbour, BMNH 1982.4.6.33, 1(1), 37.5 mm SL, BMNH 1973.1.20.90, 1(0), 27.1 mm SL; BPBM 20388, 3(3), 49.0-56.4 mm SL, BPBM 17909, 4(4), 28.9-40.5 mm SL, BPBM 20374, 1(0), 51.0 mm SL; Suakin, BMNH 1987.5.11.42, 1(0). ERITREA: Massawa (Massaua), SMF 1527, 1(1), 38.0 mm SL (lectotype), SMF 8144, 1(1), 37.0 mm SL (paralectotype), SMF 8132, 1(0), SMF 14334, 1(0), SMF 13334, 1(1), 63.8 mm SL; mouth of Melita Bay, USNM 211305, 6(6), 29.6-47.4 mm SL. YEMEN: Kamaran Ids, Uqban Id, SMF 28871, 1(0), 41.1 mm SL.

Pseudochromis flavopunctatus Gill & Randall

Yellow-spotted Dottyback
Figure 30; Plate 7B

Pseudochromis flavopunctatus Gill & Randall, 1998: 20, fig. 3 (type locality: Komodo Id, Indonesia); Gill, 1999b: 2565 (key).

DIAGNOSIS: *Pseudochromis flavopunctatus* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 25-27 (usually 26); segmented anal-fin rays 16; horizontal scale rows above anal-fin origin 10-12 + 1 + 2-3 = 13-16; and scales of body each with a large pale yellow to pale brown (pale to bright yellow in life) basal spot.

DESCRIPTION (based on eight specimens, 20.0-51.8 mm SL): dorsal-fin rays III,25-27, last 7-26 segmented rays branched (all rays branched in all but smallest specimen); anal-fin rays III,16, last 3-16 segmented rays branched (all rays branched in all but smallest specimen); pectoral-fin rays 18-20; upper procurrent caudal-fin rays 7-8; lower procurrent caudal-fin rays 7-8; total caudal-fin rays 31-33; scales in lateral series 35-39; anterior lateral-line scales 25-31; anterior lateral line terminating beneath segmented dorsal-fin ray 18-23; posterior lateral-line scales 5-8 + 0-1; scales between lateral lines 2-3; horizontal scale rows above anal-fin origin 10-12 + 1 + 2-3 = 13-16; circumpeduncular scales 16; predorsal scales 16-22; scales behind eye 2-4; scales to preopercular angle 4-6; gill rakers 5-7 + 11-13 = 16-19; pseudobranch filaments 8-13; circumorbital pores 14-32; preopercular pores 8-15; dentary pores 4; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without scale sheaths; predorsal scales extending anteriorly to point ranging from vicinity of anterior AIO pores to posterior nostrils; opercle with 3-6 relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers usually either weakly developed or with well-developed teeth confined to raker tips, sometimes with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1 + 1*/1; dorsal-fin spines moderately stout to stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1/1 + 1*/1; anal-fin spines moderately stout to stout and pungent, second spine stouter than third; pelvic-fin spine moderately stout to stout and pungent; second segmented pelvic-fin ray longer than or subequal to third; caudal fin usually rounded (truncate in smallest specimen); vertebrae 10 + 16; epineurals 13-14; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 3-4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw slightly larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on six specimens, 37.8-51.8 mm SL): head length 23.5-25.7; orbit diameter 8.8-10.6; snout length 5.6-6.0; fleshy interorbital width 5.8-6.6; bony interorbital width 3.8-4.2; body width 11.2-13.5; snout tip to posterior tip of retroarticular bone 13.5-14.5; predorsal length 30.7-33.3; prepelvic length 31.2-32.1; posterior tip of retroarticular bone to pelvic-fin origin 18.9-20.3; dorsal-fin origin to pelvic-fin origin 28.0-30.4; dorsal-fin origin to middle dorsal-fin ray 30.7-35.4; dorsal-fin origin to anal-fin origin 40.2-43.7; pelvic-fin origin to anal-fin origin 27.4-31.0; middle dorsal-fin ray to dorsal-fin termination 23.3-27.2; middle dorsal-fin ray to anal-fin origin 26.4-29.1; anal-fin origin to dorsal-fin termination 34.3-37.2; anal-fin base length 27.5-30.2; dorsal-fin termination to anal-fin termination 15.1-16.9; dorsal-fin termination to caudal peduncle dorsal edge 11.9-13.0; dorsal-fin termination to caudal peduncle ventral edge 18.9-21.2; anal-fin termination to caudal peduncle dorsal edge 20.5-22.0; anal-fin termination to caudal peduncle ventral edge 11.1-13.4; first dorsal-fin spine 1.6-2.6; second dorsal-fin spine 4.2-6.1; third dorsal-fin spine 6.6-8.7; first segmented dorsal-fin ray 9.6-11.6; fourth last segmented dorsal-fin ray 15.8-17.9; first anal-fin spine 2.0-2.5; second anal-fin spine 4.2-5.3; third anal-fin spine 6.5-8.2; first segmented anal-fin ray 10.0-11.1; fourth last segmented anal-fin ray 14.3-15.4; third pectoral-fin ray 14.1-16.0; pelvic-fin spine 9.8-12.7; second segmented pelvic-fin ray 19.7-23.5; caudal-fin length 23.8-26.5.

Live coloration (based on underwater photographs of several paratypes; Plate 7B): head and body dark olive dorsally, becoming pinkish grey ventrally; lower part of head with pale yellow spots and irregular lines; iris yellowish grey with blue suboval ring around pupil; scales of body below anterior lateral line and behind pectoral-fin base each with large pale to bright yellow basal spot; upper part of pectoral-fin base with dusky grey spot; dorsal fin olivish hyaline to olive; anal fin pinkish grey; caudal fin greyish to purplish olive basally, becoming greyish distally; basal area of caudal fin with pale to bright yellow spots and lines; pectoral fins hyaline; pelvic fins pale pink.

Preserved coloration: pattern similar to live coloration, head and body dark olive-grey to dark brown dorsally, becoming pale yellow to pale brown ventrally; yellow spots and markings on head, body and caudal fin becoming pale yellow to pale brown; dusky grey spot on pectoral axil becoming dark grey-brown; dorsal fin dusky brown to dark brown, becoming pale brown to brownish hyaline distally, sometimes with pale grey

stripe along basal third of fin; anal fin brown to brownish hyaline, usually with two or three rows of small pale spots on basal part of fin; caudal fin dusky grey to brown with pale yellow spots basally, upper and lower edges of fin broadly pale grey to white submarginally; pectoral fins hyaline; pelvic fins pale yellow or pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis flavopunctatus* is known only from the type specimens from Komodo, Indonesia (Figure 30). They were collected from rocky reef areas with rich sessile invertebrate cover (e.g., hard and soft corals and sponges) at depths of 15 to 28 m.

COMPARISONS: *Pseudochromis flavopunctatus* resembles *P. aurulentus* and *P. pylei* in general morphology and in having a dark spot on the axil of the pectoral fin. Characters distinguishing the three species are discussed under *Remarks* for *P. aurulentus*. The presence of pale spots on the body scales may lead to confusion with *P. alticaudex* and *P. marshallensis*. *Pseudochromis flavopunctatus* is readily distinguished from these species in having more segmented dorsal-fin rays (25-27, usually 26 versus 24-25 for *P. alticaudex*, and 24-27, usually 25 for *P. marshallensis*) and more segmented anal-fin rays (16 versus 12-13 for *P. alticaudex* and 11-14, usually 13 for *P. marshallensis*).

REMARKS: *Pseudochromis flavopunctatus* is a moderate-sized species; the largest specimen examined measured 51.8 mm SL. Gill & Randall (1998) provide a colour photograph of the species.

ETYMOLOGY: The specific epithet is from the Latin *flavus*, yellow, and *punctum*, a hole or dot, and alludes to the characteristic live coloration. Gender is masculine.

MATERIAL EXAMINED: INDONESIA: E coast of Komodo, un-named islet at 8°31'42"S 119°37'50"E; BPBM 31539, 1(1), 51.8 mm SL (holotype); E coast of Komodo, islet at 8°31'43"S 119°37'50"E, AMS I.29534-001, 1(1), 44.9 mm SL (paratype; subsequently cleared and stained), BPBM 32417, 3(3) 20.0-50.0 mm SL (paratypes); Komodo, off Turo Liu Point at NE corner of Slawi Bay, BPBM 36507, 3(3), 37.8-51.0 mm SL (paratypes).

Pseudochromis fowleri Herre
Philippine Dottyback
Figures 30, 41

Pseudochromis fowleri; Herre, 1933b: 8 (*nomen nudum*; list).
Pseudochromis fowleri Herre, 1934: 45 (type locality: near Dumaguete, Negros Id, Philippines); Roxas & Martin, 1937: 123 (list); Böhlke, 1953: 70 (list); Herre, 1953: 372 (list); Gill, 1999b: 2565 (key).
Pseudochromis swaini Herre, 1934: 46 (type locality: Culion Harbour, Culion, Philippines); Roxas & Martin, 1937: 123 (list); Böhlke, 1953: 70 (list); Herre, 1953: 373 (list).

DIAGNOSIS: A species of *Pseudochromis* with the following combination of characters: segmented dorsal-fin rays 23-25 (usually 24) with a few to most anterior rays unbranched; segmented anal-fin rays 13-14 (usually 14); scales in lateral series 30-34; circumpeduncular scales 16; and second anal fin spine stouter than third.

DESCRIPTION (based on 27 specimens, 17.4-43.0 mm SL): dorsal-fin rays III,23-25, last 6-21 segmented rays branched; anal-fin rays III,13-14, last 7-14 segmented rays branched; pectoral-fin rays 17-19; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 29-31; scales in lateral series 30-34; anterior lateral-line scales 20-27; anterior lateral line terminating beneath segmented dorsal-fin ray 13-19; posterior lateral-line scales 4-10 + 0-2; scales between lateral lines 2-4; horizontal scale rows above anal-fin origin 11-13 + 1 + 2-4 = 15-17; circumpeduncular scales 16; predorsal scales 13-18; scales behind eye 2-4; scales to preopercular angle 3-4; gill rakers 4-7 + 11-13 = 15-19; pseudobranch filaments 7-10; circumorbital pores 19-31; preopercular pores 10-16; dentary pores 4-5; posterior interorbital pores 1-3.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of anterior AIO pores to midway between posterior nasal pores and posterior nostrils; opercle with 3-7, usually relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed mainly on raker tips only, although often with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1*/1/1/1/1/1/1 + 1*/1/1; dorsal-fin spines moderately stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1/1 + 1*/1; anal-fin spines moderately stout and pungent, second spine stouter than third; pelvic-fin spine moderately stout and pungent; second segmented pelvic-fin ray longest; caudal fin emarginate; vertebrae 10 + 16; epineurals 13; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw slightly larger and curved; vomer with 1 row of small conical teeth, forming chevron; palatine with 1-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 14 specimens, 21.6-43.0 mm SL): head length 25.8-31.0; orbit diameter 8.8-12.5; snout length 5.0-7.0; fleshy interorbital width 5.1-6.8; bony interorbital width 3.5-4.4; body width 12.7-14.8; snout tip to posterior tip of retroarticular bone 14.7-16.7; predorsal length 34.0-39.8; prepelvic length 33.6-35.8; posterior tip of retroarticular bone to pelvic-fin origin 19.1-22.3; dorsal-fin origin to pelvic-fin origin 29.7-35.1; dorsal-fin origin to middle dorsal-fin ray 32.3-36.0; dorsal-fin origin to anal-fin origin 41.9-47.4; pelvic-fin origin to anal-fin origin 27.2-31.7; middle dorsal-fin ray to dorsal-fin termination 22.6-26.6; middle dorsal-fin ray to anal-fin origin 28.4-32.7; anal-fin origin to dorsal-fin termination

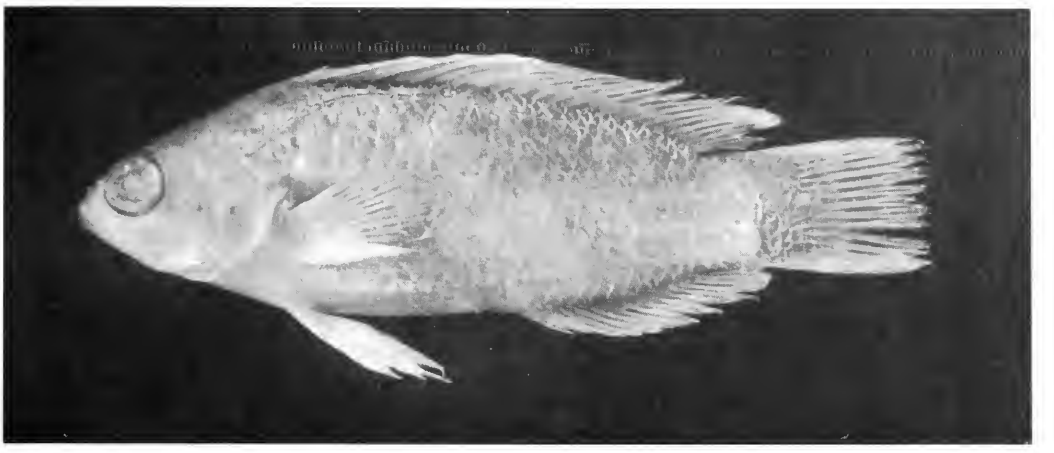

Figure 41. *Pseudochromis fowleri*, WAM P.30412-008, 37.0 mm SL, Bohaydulong Island, Bodgaya Islands, Sabah. (Photo by P. Crabb)

34.5-37.5; anal-fin base length 23.9-27.9; dorsal-fin termination to anal-fin termination 16.2-18.6; dorsal-fin termination to caudal peduncle dorsal edge 9.2-10.8; dorsal-fin termination to caudal peduncle ventral edge 18.4-20.8; anal-fin termination to caudal peduncle dorsal edge 20.0-23.1; anal-fin termination to caudal peduncle ventral edge 11.3-12.8; first dorsal-fin spine 0.9-4.1; second dorsal-fin spine 6.3-8.6; third dorsal-fin spine 9.5-12.0; first segmented dorsal-fin ray 13.7-16.4; fourth last segmented dorsal-fin ray 16.9-20.5; first anal-fin spine 2.6-3.8; second anal-fin spine 8.4-11.6; third anal-fin spine 10.0-13.8; first segmented anal-fin ray 13.1-15.7; fourth last segmented anal-fin ray 13.1-18.1; third pectoral-fin ray 14.3-18.4; pelvic-fin spine 10.9-13.4; second segmented pelvic-fin ray 25.0-41.9; caudal-fin length 25.5-28.3.

Live coloration: not known.

Preserved coloration: head and body brown, paler ventrally; midposterior orbital rim dark grey-brown; scales of upper few horizontal scale rows below anterior lateral line sometimes with indistinct dusky brown basal spot; large pale brown blotch sometimes present just above anal-fin origin; spinous portion and distal third of dorsal fin pale grey to whitish hyaline, remainder of fin brown to dark greyish brown; interradial membranes at distal portion of brown to dark greyish brown section of fin crossed by one to five oblique pale narrow lines; anal fin brown to dark greyish brown, becoming pale grey to whitish hyaline anteriorly and distally, sometimes with one or two oblique pale narrow lines on distal part of brown to dark greyish brown portion; caudal fin dusky grey-brown to greyish hyaline, dorsal and ventral edges of fin abruptly pale grey to whitish hyaline; pectoral fins hyaline; pelvic fins greyish hyaline to hyaline, anterior margins often pale grey to whitish hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis fowleri* is currently known only from several localities in the Philippines and from Sabah, northern Borneo (Figure 30). It has been collected from tidepools and shallow reef areas at depths ranging from 0.1 to 1.5 m.

COMPARISONS: Although its preserved coloration is fairly nondescript, this species has relatively distinct low meristic values and is unlikely to be confused with other pseudochromines. The combination of 23-25 (usually 24) segmented dorsal-fin rays, 13-14 (usually 14) segmented anal-fin rays, 30-34 scales in lateral series, 16 circumpeduncular scales, a few to most anterior segmented dorsal-fin rays unbranched, and the second anal-fin spine stouter than the third distinguishes it within the subfamily.

REMARKS: *Pseudochromis fowleri* is a small species; the largest specimen examined measured 43.0 mm SL. The holotypes of *P. fowleri* and *P. swaini* were examined and found to be conspecific. The two nominal species were described on consecutive pages in the same paper. Since no references could be found listing either species in synonymy with the other, as first revisor I relegate *P. swaini* to junior synonymy due to position precedence. Aside from listings, neither *P. fowleri* nor *P. swaini* have been treated in the literature since their original descriptions.

ETYMOLOGY: The specific epithet is for the American ichthyologist Henry Weed Fowler.

MATERIAL EXAMINED: PHILIPPINES: Calamian Group, Culion Id, reef in Culion Harbour, CAS-SU 26772, 1(1), 35.2 mm SL (holotype of *P. swaini* Herre); Cuyo Id, USNM 290944, 8(8), 19.3-42.8 mm SL; Negros Id, tidepool 12 km N of Dumaguete, CAS-SU 28510, 1(1), 43.0 mm SL (holotype of *P. fowleri* Herre). SABAH, MALAYSIA: Darvel Bay, Bodgaya Ids, Pulau Gaya, USNM 290958, 7(7), 27.4-38.1 mm SL; Darvel Bay, Bodgaya Ids, Pulau Bohaydulong, WAM P.30412-008, 10(10), 17.3-40.1 mm SL.

Pseudochromis fridmani Klausewitz

Orchid Dottyback

Figure 42; Plate 7C

Pseudochromis fridmani Klausewitz 1968: 444, figs 1-3 (type locality: Eilat, Gulf of Aqaba, Red Sea); Klausewitz, 1975: 216 (habitat and distribution; aquarium notes; colour fig.); Lubbock, 1975: 147, pl. 2, fig. c (description; distribution); Graf, 1978: 279 (colour fig.); Randall, 1983: 58-59 (description and colour figs); Ben-Tuvia et al., 1983: 197 (list; habitat); Debelius, 1984a: 119 (colour fig.); Debelius, 1984b: 427

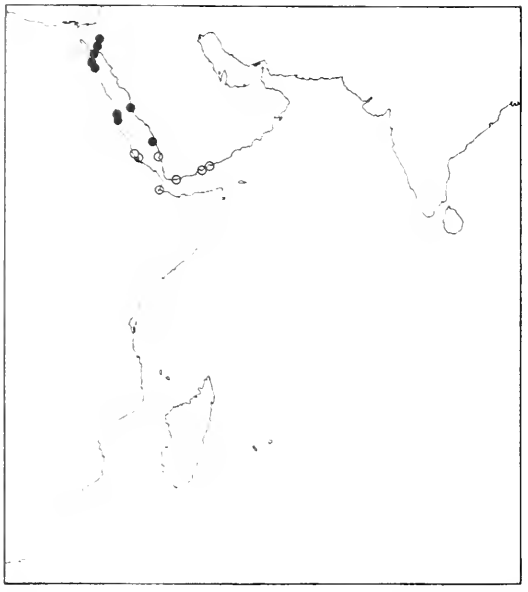

Figure 42. Distributional records for *Pseudochromis fridmani* (closed circles) and *P. sankeyi* (open circles).

(colour figs); Masuda, 1984: 74 (Egypt; colour fig.); Wheeler, 1985: pl. 269 (colour fig.); Kühling, 1985: 365 (colour fig.); Debelius, 1986: 15 (black and white fig.), 17 (colour fig.); Allen & Steene, 1987: pl. 32, fig. 3 (Gulf of Aqaba); Debelius, 1987: 47 (colour fig.); Burgess et al., 1988: pl. 155 (colour fig.); Esterbauer, 1990a: 66 (habitat and distribution; aquarium notes; colour figs); Esterbauer, 1990b: 725 (habitat and distribution; aquarium notes; colour figs); Michael, 1990a: 15 (aquarium notes); Michael, 1990b: 16 (colour fig.); Brower, 1991: 253 (colour fig.); Burgess et al., 1991: 207 (colour fig.); Baensch & Debelius, 1992: 974 (habitat and distribution; colour fig.); Fosså & Nilsen, 1993: 131 (colour fig.; habitat and distribution; aquarium notes); Masuda & Allen, 1993: 130, fig. A (colour fig.); Debelius, 1993: 113 (colour fig.; habitat and distribution); Goren & Dor, 1994: 28 (list); Göthel, 1994: 104 (colour fig.; habitat & distribution); Lieske & Myers, 1994: pl. 31, fig. 1 (colour fig.; habitat and distribution); Randall, 1994: 272 (distribution); Debelius, 1996: 113 (colour fig.; habitat and distribution); Moe, 1997: 26 (courtship behaviour; captive breeding); Shpigel, 1997: 66 (colour fig.; habitat and distribution; biological notes); Wittenrich, 1998: 54, four unnumbered figs (captive breeding; colour figs); Field & Field, 1998: 78 (colour fig.); Debelius, 1998: 67 (colour figs; habitat and distribution).

DIAGNOSIS: *Pseudochromis fridmani* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 25-27 (usually 26); segmented anal-fin rays 14-15 (usually 15); circumpeduncular scales 16-18; horizontal scales above anal-fin origin 11-13 + 1 + 2-3 = 14-17; gill rakers 6-8 + 15-17 = 21-25; well-developed teeth of outer ceratobranchial-1 rakers arranged in two rows running most of raker lengths; and body relatively shallow (dorsal-fin origin to pelvic-fin origin 20.8-25.0 % SL).

DESCRIPTION (based on 25 specimens, 26.5-49.9 mm SL): dorsal-fin rays III,25-27, last 5-26 segmented rays branched; anal-fin rays III,14-15, last 6-15 segmented rays branched (all or all but first 1-2 branched in specimens larger than about 35 mm SL); pectoral-fin rays 15-17; upper procurrent caudal-fin rays 7-8; lower procurrent caudal-fin rays 6-8; total caudal-fin rays 30-33; scales in lateral series 38-45; anterior lateral-line scales 23-28; anterior lateral line terminating beneath segmented dorsal-fin ray 13-16; posterior lateral-line scales 2-9 + 0-1; scales between lateral lines 3-5; horizontal scale rows above anal-fin origin 11-13 + 1 + 2-3 = 14-17; circumpeduncular scales 16-18; predorsal scales 17-25; scales behind eye 2-4; scales to preopercular angle 4-5; gill rakers 6-8 + 15-17 = 21-25; pseudobranch filaments 7-10; circumorbital pores 15-24; preopercular pores 10-15; dentary pores 4; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of anterior AIO pores to posterior nostrils; opercle with 3-7, usually relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed, arranged in 2 rows running most of length of rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1 + 1*/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1/1 + 1/1 + 1*/1; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray longest; caudal fin rounded with lower lobe produced, sometimes with upper lobe also produced; vertebrae 10 + 16; epineurals 13-15; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw slightly larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 18 specimens, 26.5-49.9 mm SL): head length 19.8-26.0; orbit diameter 6.6-10.6; snout length 4.6-5.7; fleshy interorbital width 4.9-6.4; bony interorbital width 3.4-4.7; body width 8.6-12.1; snout tip to posterior tip of retroarticular bone 10.8-14.0; predorsal length 28.7-34.0; prepelvic length 28.1-33.6; posterior tip of retroarticular bone to pelvic-fin origin 17.9-21.1; dorsal-fin origin to pelvic-fin origin 20.8-25.0; dorsal-fin origin to middle dorsal-fin ray 32.8-36.5; dorsal-fin origin to anal-fin origin 36.5-39.2; pelvic-fin origin to anal-fin origin 27.0-30.4; middle dorsal-fin ray to dorsal-fin termination 25.0-29.5; middle dorsal-fin ray to anal-fin origin 19.5-22.9; anal-fin origin to dorsal-fin termination 32.3-35.4; anal-fin base length 25.7-29.8; dorsal-fin termination to anal-fin termination 12.3-15.1; dorsal-fin termination to caudal peduncle dorsal edge 10.9-12.8; dorsal-fin termination to caudal peduncle ventral edge 17.1-19.4; anal-fin termination to caudal peduncle dorsal edge 18.5-20.6; anal-fin termination

to caudal peduncle ventral edge 13.2-15.0; first dorsal-fin spine 1.1-2.2; second dorsal-fin spine 2.6-6.0; third dorsal-fin spine 3.4-9.8; first segmented dorsal-fin ray 9.8-13.6; fourth last segmented dorsal-fin ray 13.1-17.7; first anal-fin spine 1.5-2.6; second anal-fin spine 4.9-8.0; third anal-fin spine 4.3-8.0; first segmented anal-fin ray 9.6-13.2; fourth last segmented anal-fin ray 11.6-14.4; third pectoral-fin ray 11.7-14.7; pelvic-fin spine 8.2-11.8; second segmented pelvic-fin ray 15.2-18.1; caudal-fin length 19.7-32.4.

Live coloration (based on photographs of specimens from the Red Sea, field observations of individuals in the Strait of Tiran, Egypt, and notes taken from captive specimens; Plate 7C): head and body magenta; dark grey stripe extending from snout tip through eye to upper part of preopercle; iris purplish blue to magenta with blue suboval ring around pupil; small dusky to dark grey spot on opercular flap; each body scale with vertically elongate dark blue mark; dorsal fin rays magenta, interradial membranes magenta basally and hyaline distally; anal fin magenta; caudal fin magenta, upper portion of fin hyaline distally; pectoral fins hyaline; pelvic fins magenta.

Preserved coloration: head and body pinkish brown; dark grey to black stripe extending from tip of lower lip through eye to upper part of preopercle; dusky to dark grey spot on opercular flap; body scales with elongate dark grey to dark brown basal marks; dorsal and caudal fins pale brown to hyaline; anal fin pale brown to hyaline distally, dark purplish grey basally; pectoral fins hyaline; pelvic fins pale grey to pale brown.

HABITAT AND DISTRIBUTION: *Pseudochromis fridmani* is known only from the Red Sea. It has been observed (Lubbock, 1975) and collected from the Gulfs of Aqaba and Suez south to the Farasan Ids (Figure 42). It has been collected mainly from vertical reef faces and overhangs at depths between 1 and 30 m. However, Göthel (1994: 104) noted that the species ranges down to about 60 m depth.

COMPARISONS: This species resembles *P. sankeyi* in having 25-27 segmented dorsal-fin rays, 14-15 anal segmented rays, 38-45 scales in lateral series, 6-8 + 15-17 = 21-25 gill rakers, well-developed teeth on outer ceratobranchial-1 rakers running most of raker lengths, a dark spot on the opercular flap, a relatively shallow body (dorsal-fin origin to pelvic-fin origin 20.8-25.0 % SL), and a rounded caudal fin with the lower lobe produced. It differs from *P. sankeyi* in having fewer scales below the anterior lateral line (11-13 versus 14-16), fewer circumpeduncular scales (16-18 versus 19-20, usually 20), and a markedly different live and preserved coloration (in life head and body magenta with a dark grey stripe extending from the snout tip to the eye and a series of vertically elongate dark blue marks on body scales versus head and body pale pinkish brown to white, dark olive to dark grey-brown dorsally, with two broad black stripes, one along the midside of the body and the other along the ventral part of the body).

REMARKS: *Pseudochromis fridmani* is a relatively small species; the largest specimen examined measured 49.9 mm SL. This species has been illustrated frequently, particularly in the aquarium fish literature; photographs are provided, for example, in Lubbock (1975), Randall (1983), Masuda (1984), Debelius (1986, 1987, 1996, 1998), Allen & Steene (1987), Burgess et al. (1988), Esterbauer (1990a and b), Michael (1990b), Brower (1991), Fosså & Nilsen (1993), Göthel (1994) and Field & Field (1998).

This species is unusual among pseudochromines in that it lives in colonies consisting of a large number of small, tightly spaced individual territories (Lubbock, 1975; pers. obs.). The closely related *P. sankeyi* also lives in groups, but is even more unusual in that it forms schools.

Several authors have reported captive breeding and courtship behaviour in *P. fridmani* (e.g., Brons, 1996; Moe, 1997; Wilkerson, 1997; Wittenrich, 1998); several commercial breeders are now breeding the species for the aquarium fish trade (Brons, 1996; Moe, 1997; Wilkerson, 1997).

Lubbock (1975: 147) noted that males differed from females in having a darker anal fin and a longer and more conspicuous (darker) lower caudal-fin lobe. The latter difference was also noted for captive breeding pairs by Moe (1997) and Wittenrich (1998). However, Brons (1996) noted that neither anal-fin coloration nor caudal-fin shape were reliable indicators of sex. The present study of museum specimens also failed to find a convincing relationship between these characteristics and sex.

ETYMOLOGY: The specific epithet is for David Fridman, of the Maritime Museum in Eilat, Israel, who collected the holotype and several of the paratypes.

MATERIAL EXAMINED (all Red Sea): GULF OF AQABA: Israel, Elat (Eilat), BPBM 18322, 1(0), 31.0 mm SL, BPBM 13388, 1(0), 36.0 mm SL, SMF 9435, 1(1), 36.7 mm SL (holotype), SMF 9517, 1(0) (paratype), SMF 9518, 1(0) (paratype); Israel, El Himira, USNM 278102, 12(0), USNM 278105, 8(0), USNM 278106, 5(0); Egypt, Dahab, SMF 13148, 1(0); Egypt, Sharm el Sheikh, HUJ E.57/208, 2(0) (paratypes), SMF 9514, 1(0) (paratype); Egypt, Ras Muhammad, BMNH 1972.11.21.5, 1(0), 48.9 mm SL, BPBM 18357, 1(0), 21.5 mm SL, HUJ F.4744, 3(0) (paratypes), SMF 9515, 1(0) (paratype), USNM 211775, 106(18, 28.8-49.9 mm SL; 3 specimens, 20.1-45.6 mm SL, cleared and stained), 15.5-45.6 mm SL, USNM 278104, 21(0); Jordan, Aqaba, BMNH 1973.12.20.116-165, 50(0), 17.5-48.5 mm SL, SMF 14095, 1(0). EGYPT: N of Marsa Bareka, near Shasem, ROM 43607, 4(4), 26.5-34.9 mm SL; Quseir, USNM 178101, 1(0); SUDAN: Port Sudan, BMNH 1975.4.5.18-21, 4(0), BMNH 1973.12.20.108-114, 7(0), 31.4-39.1 mm SL, BMNH 1973.12.20.105-107, 3(0), 32.0-42.5 mm SL; Towartit Reef, BPBM 27464, 5(5), 28.8-38.5 mm SL; Suakin Harbour, BPBM 30226, 3(0), 22.0-30.0 mm SL. SAUDI ARABIA: Khor Obhour, ANSP uncat., 8(0); Jiddah, BMNH 1973.12.20.115, 1(0), 33.3 mm SL, BMNH 1984.6.4.4, 1(0).

Pseudochromis fuscus Müller & Troschel
Brown Dottyback
Figures 4B, 23B, 24A, 43; Plates 7D-J; Tables 5-7

Pseudochromis fuscus Müller & Troschel, 1849: 23, pl. 4, fig. 2 (type locality: Celebes); Günther, 1860: 257 (compilation); Günther, 1876: 159 (description; Yap, Pelew and Solomon Ids); Bleeker, 1877: pl. 388, fig. 4; Day, 1888: 791 (synonymy with *P. xanthochir* Bleeker); McCulloch & Whitley, 1925: 150 (synonymy with *O. nebulosum* De Vis and *P. wildii* Ogilby); Fowler, 1928: 189 (description; Shortland Id,

Solomon Ids); Weber & de Beaufort, 1931: 130 (description; distribution); Herre, 1934: 46 (Buang Sur, Jolo and Sitankai, Philippines); Fowler, 1934: 412 (list); Fowler, 1944: 168 (New Hebrides); Fowler, 1949: 88 (list); Harry, 1949: 142 (Purvis Bay, Florida Id, Solomon Ids); Mendis, 1954: 123 (list; Ceylon); Munro, 1955: 115, pl. 20, fig. 312 (description; Ceylon); Inger, 1957: 367 (description; Borneo); Munro, 1967: 281, pl. 35, fig. 503 (description; Papua New Guinea); Burgess & Axelrod, 1975: figs 155-156 (colour figs; Solomon Ids and Papua New Guinea); Lubbock, 1976: 167 (Sri Lanka); Russell, 1983: 44 (Capricorn-Bunker Group, Great Barrier Reef); Thresher, 1984: 104, 123 (reproductive behaviour; colour figs); Allen, 1985: 2508, figs 147-148 (list, Western Australia; colour figs); Allen & Russell, 1986: 85 (list, Rowley Shoals and Scott Reef, Timor Sea); Kailola, 1987: 243 (list, Papua New Guinea); Matsuura & Hayashi, 1987: 80, 83 (list, Makambo Id, Solomon Ids); Allen & Swainston, 1988: 60, pl. 21, fig. 334; Burgess et al., 1988: pl. 152 (colour fig.); Paxton et al., 1989: 519 (list; distribution); Myers, 1989: 113, 274, pl. 37c (description; distribution; colour fig.); Gill, 1990b: 127 (description; distribution; colour figs); Michael, 1990b: 16 (colour fig.; aquarium notes); Baensch & Debelius, 1992: 974 (colour figs; not sexual dimorphism); Kuiter, 1992: 42, figs a and b (colour figs); Hayashi, 1992: 65 (Amami and Yaeyama Ids, Ryukyu Ids); Fosså & Nilsen, 1993: 128 (colour fig.); Wood et al., 1994: 124 (list; Pulau Sipidan); Shao, 1994: 300, fig. 77-6 (description; colour fig.); Lieske & Myers, 1994: pl. 33, fig. 1 (colour fig.; colour variation; habitat and distribution); Kuiter & Debelius, 1994: 114 (colour fig.; habitat and distribution); Masuda & Kobayashi, 1994: 126, fig. 4 (colour fig.); Gill, 1995: 245 (lectotype designation for *P. xanthochir*); Eichler & Myers, 1997: 120 (distribution; colour figs); Gill, 1997: 127 (description; distribution; colour fig.); Allen, 1997: 94, pl. 28-11 (description; distribution; col. figs); Myers, 1999: 121, pl. 48C (description; distribution; colour fig.); Gill, 1999b: 2574 (description; distribution; fig.).

Pseudochromis adustus Müller & Troschel, 1849: 23, pl. 4, fig. 3 (type locality: Philippines); Günther, 1860: 258 (compilation).

Pseudochromis xanthochir Bleeker, 1855a: 443 (type locality: Manado, Celebes); Günther, 1860: 257 (compilation); Bleeker, 1877: pl. 388, fig. 1.

Pseudochromis (Pseudochromis) fuscus; Bleeker, 1875: 16, pl. 1, fig. 5 (description; various Indonesian localities).

Pseudochromis (Pseudochromis) xanthochir; Bleeker, 1875: 17, pl. 3, fig. 4 (Bawean, Celebes and Buro).

Pseudochromis (Pseudochromis) adustus; Bleeker, 1875: 18 (compilation).

Onar nebulosum De Vis, 1885: 875 (type locality: Murray Id, Queensland).

Pseudochromis wildii Ogilby, 1908: 34 (type locality: Moreton Bay, Queensland).

Pseudochromis aurea Seale, 1910: 528 (type locality: Sitanki Id, Philippines).

Pseudochromis tapeinosoma [*non* Bleeker, 1853a]; Fowler, 1927: 276 (description; Philippines).

Dampieria lineata [*non* Castelnau, 1875]; Whitley, 1928: 295 (Lady Musgrave Id, Great Barrier Reef).

Pseudochromis (Devisina) aureus; Fowler, 1931b: 27 (compilation).

Pseudochromis (Devisina) fuscus; Fowler, 1931b: 28 (description).

Peudochromis (Devisina) xanthochir; Fowler, 1931b: 30 (description; not syonymy).

Pseudochromis wardii; Fowler, 1931b: 28 (misspelling for *P. wildii* Ogilby, 1908).

Nesiotes purpurascens [*non* De Vis, 1884]; Herre, 1931b: 13 (Efate Id, New Hebrides; listed under new family "Nesiotidae"); Herre, 1936: 165, fig. 8 (description; Efate Id, New Hebrides); Grey, 1947: 170 (list; incorrect neotype designation); Ibarra & Stewart, 1987: 60, 101 (list).

Pseudochromis aureus; Herre, 1934: 45 (Leyte, Jolo and Sitankai, Philippines); Russell, 1983: 43 (Capricorn-Bunker Group, Great Barrier Reef); Debelius, 1984b: 426 (colour fig.); Debelius, 1986: 20 (colour fig.); Burgess et al., 1988: pl. 152 (colour fig.); Burgess et al., 1991: 202 (colour fig.); Shao, 1994: 300 (description).

?*Pseudochromis olivaceus* [*non* Rüppell, 1835]; Aoyagi, 1941a: 58 (Palau Ids); Aoyagi, 1941c: 48, fig. 3 (description; Palau Ids).

Pseudochromis purpurascens [*non Nesiotes purpurascens* De Vis, 1884]; Aoyagi, 1941b: 57 (description; Palau).

Devisina fusca; Munro, 1958: 169 (list; New Guinea).

Pseudochromis (Devisina) aureus; Woodland & Slack-Smith, 1964: 30 (Heron Id, Great Barrier Reef).

Devisina aurea; Whitley, 1964a: 42 (list).

Dampieria cyclophthalma [*non Cichlops cyclophthalmus* Müller & Troschel, 1849]; Masuda et al., 1975: fig. 53-k (southern Japan).

Labracinus lineatus [*non Dampieria lineata* Castelnau, 1875]; Russell, 1983: 43 (Capricorn-Bunker Group, Great Barrier Reef).

DIAGNOSIS: *Pseudochromis fuscus* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 25-29; segmented anal-fin rays 13-15, usually 14; circumpeduncular scales 16-23, usually 20; well developed teeth on outer ceratobranchial-1 gill rakers arranged in two rows running most of raker lengths; dorsal-fin origin to pelvic-fin origin 29.7-35.7 % SL; and anal-fin termination to caudal peduncle ventral edge 9.1-11.5 % SL.

DESCRIPTION (based on 199 specimens, 24.5-72.0 mm SL): dorsal-fin rays III,25-29, last 4-27 segmented rays branched (rarely all segmented rays branched); anal-fin rays III,13-15, last 6-15 segmented rays branched (all or all but first 1-3 branched in specimens larger than about 35 mm SL); pectoral-fin rays 16-20; upper procurrent caudal-fin rays 5-7; lower procurrent caudal-fin rays 4-7; total caudal-fin rays 27-31; scales in lateral series 33-43; anterior lateral-line scales 17-36; anterior lateral line terminating beneath segmented dorsal-fin ray 8-22; posterior lateral-line scales 4-14 + 0-3; scales between lateral lines 3-6; horizontal scale rows above anal-fin origin 12-18 + 1 + 2-5 = 16-23; circumpeduncular scales 16-23; predorsal scales 20-35; scales behind eye 2-5; scales to preopercular angle 3-6; gill rakers 5-9 + 11-15 = 16-21; pseudobranch filaments 8-15; circumorbital pores 16-38; preopercular pores 9-26; dentary pores 4-6; posterior interorbital pores 0-3.

Lower lip incomplete; dorsal and anal fins usually with

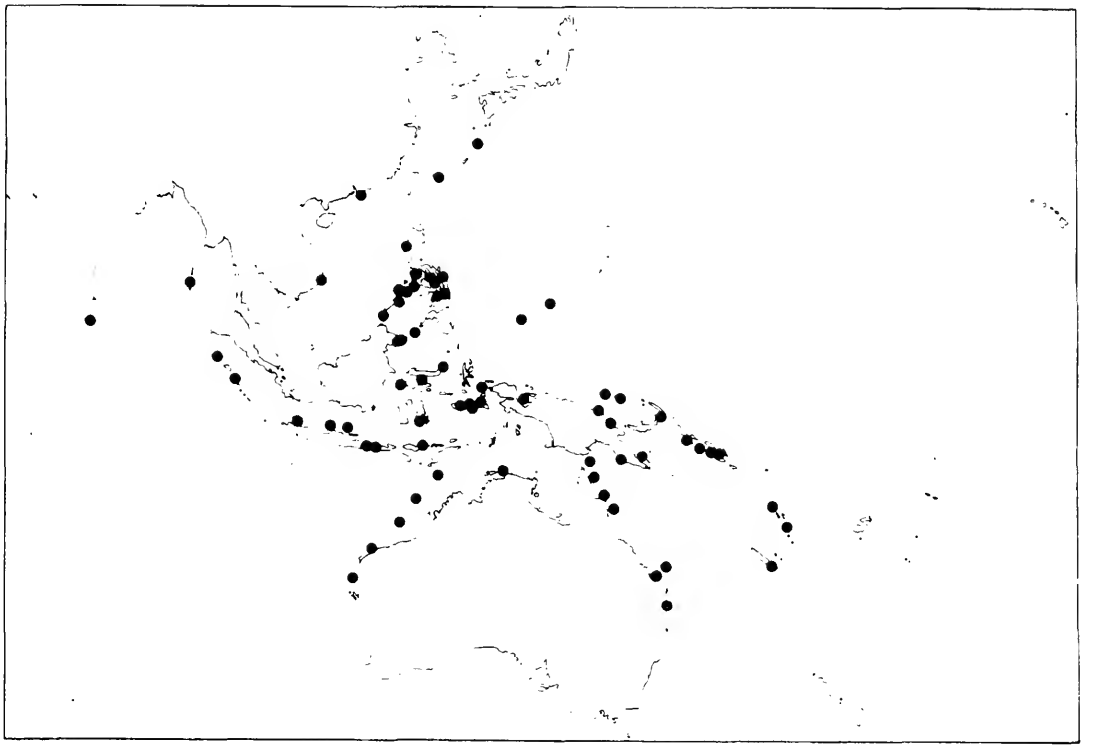

Figure 43. Distributional records for *Pseudochromis fuscus*.

weakly to strongly developed scale sheaths, these usually best developed posteriorly, although sometimes absent; predorsal scales extending anteriorly to point ranging from posterior AIO pores to anterior nostrils; opercle with 4-7, usually relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed and arranged in two rows running most of raker lengths, although often weakly developed in specimens smaller than about 30 mm SL; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1/1 + 1*/1 or S/S/S + 3/1 + 1/1/1/1 + 1*/1/1/1 + 1*; dorsal-fin spines moderately stout to stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1/1 or 3/1/1/1 + 1/1; anal-fin spines moderately stout to stout and pungent, second spine stouter to much stouter than third; pelvic-fin spine moderately stout to stout and pungent; second segmented pelvic-fin ray longest, although rarely subequal to third; caudal fin rounded to truncate or emarginate; vertebrae 10-11 (rarely 11) + 16; epineurals 12-14; epurals 3.

Upper jaw with 1-5 pairs of curved, enlarged caniniform teeth anteriorly, and 4-7 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-6 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 41 specimens, 24.5-72.0 mm SL): head length 25.3-30.6; orbit diameter 7.5-12.7; snout length 6.6-8.1; fleshy interorbital width 5.2-7.0; bony interorbital width 3.1-4.9; body width 11.1-13.8; snout tip to posterior tip of retroarticular bone 15.5-17.9; predorsal length 33.8-39.5; prepelvic length 32.8-37.4; posterior tip of retroarticular bone to pelvic-fin origin 18.1-21.1; dorsal-fin origin to pelvic-fin origin 29.7-35.7; dorsal-fin origin to middle dorsal-fin ray 32.6-39.1; dorsal-fin origin to anal-fin origin 42.1-49.0; pelvic-fin origin to anal-fin origin 28.1-34.6; middle dorsal-fin ray to dorsal-fin termination 21.0-27.0; middle dorsal-fin ray to anal-fin origin 28.0-35.0; anal-fin origin to dorsal-fin termination 33.1-37.3; anal-fin base length 24.3-28.0; dorsal-fin termination to anal-fin termination 14.8-18.3; dorsal-fin termination to caudal peduncle dorsal edge 7.8-10.5; dorsal-fin termination to caudal peduncle ventral edge 16.1-19.5; anal-fin termination to caudal peduncle dorsal edge 18.2-21.0; anal-fin termination to caudal peduncle ventral edge 9.1-11.5; first dorsal-fin spine 1.8-4.4; second dorsal-fin spine 5.1-7.9; third dorsal-fin spine 6.4-10.3; first segmented dorsal-fin ray 11.1-14.6; fourth last segmented dorsal-fin ray 16.3-20.8; first anal-fin spine 2.5-5.0; second anal-fin spine 7.2-12.1; third anal-fin spine 9.0-12.4; first segmented anal-fin ray 11.4-15.4; fourth last segmented anal-fin ray 15.8-20.9; third pectoral-fin ray 15.2-18.2; pelvic-fin spine 10.1-12.9; second segmented pelvic-fin ray 22.4-38.7; caudal-fin length 23.9-27.6.

Live coloration (based on photographs of specimens from the Philippines, Belau, Indonesia, north-western Australia, Papua New Guinea, the Solomon Ids and the Great Barrier Reef, on field observations at One Tree Id, southern Great Barrier Reef, and the North West Shelf, Western Australia,

and on captive specimens; Plates 7D-J): head and body varying from bright yellow through bluish grey to dark grey or black, sometimes with dorsal contour of body below dorsal fin base abruptly bright yellow; posteroventral rim of orbit bright yellow or bright red to reddish or bluish grey, this edged posteriorly by short grey to dark blue or dark grey vertical streak; iris bright yellow or orange to dark grey with blue suboval ring around pupil; scales of body each with indistinct to distinct mauve to dark blue basal spot, spots often aligned to form stipes; pectoral-fin base either matching adjacent body coloration or abruptly dark blue to black; dorsal and anal fins matching adjacent body coloration, usually with distal margins blue and about three to ten horizontal rows of pale blue to dark blue spots and short streaks; caudal fin white or bright yellow through bluish grey to black, either matching adjacent body coloration or abruptly paler; fin either immaculate or with blue distal margin and several vertical to convex rows of blue spots; dark-tailed specimens often with narrow dark grey to black submarginal line, this bordered proximally on upper and lower part of fin by broad reddish grey or bright yellow to bright red stripes; pectoral fins bright yellowish to bluish or greyish hyaline; pelvic fins bright yellow to dark blue or black, usually with leading edge of fin and sometimes edges of segmented rays blue.

Preserved coloration: pattern similar to live coloration, bright yellow areas on head and body becoming pale yellow to pale brown; bluish grey to dark grey or black areas becoming brown or dark grey-brown to dark grey or black; dorsal, anal, caudal and pelvic fins becoming pale yellowish or brownish hyaline to dark grey-brown or black, blue spots and streaks becoming brown to dark brown; pectoral fins usually hyaline to brownish hyaline, rarely dark brown to black.

HABITAT AND DISTRIBUTION: *Pseudochromis fuscus* is one of the most widely distributed pseudochromines, ranging from Sri Lanka east to Yap Id and Vanuatu, north to the Ryukyu Ids (Hayashi, 1992), and south to the central coast of Western Australia and the southern coast of Queensland (Figure 43). Yu & Chung (1975) recorded *P. fuscus* (as *P. xanthochir*) from Liuchiu Id, southern Taiwan, but their description does not match *P. fuscus*, and possibly refers to *P. marshallensis*. Shao (1994) illustrated a specimen of *P. fuscus* from Taiwan. *Pseudochromis fuscus* has been observed (pers. obs.) and collected from rock and coral reefs in lagoons, on reefs flats and on reef slopes at depths ranging to 30 m. It is usually associated with branching corals, such as *Acropora* and *Pocillopora*.

COMPARISONS: *Pseudochromis fuscus* is a relatively distinctive pseudochromine in having the following combination of characters: segmented dorsal-fin rays 25-29; segmented anal-fin rays 13-15, usually 14; circumpeduncular scales 16-23, usually 20; and well-developed teeth of outer ceratobranchial-1 gill rakers arranged in two rows running most of the lengths of the rakers. The only other pseudochromine with a similar character combination is *P. flavivertex* from the Red Sea; characters distinguishing the two species are discussed under *Comparisons* for *P. flavivertex*.

REMARKS: *Pseudochromis fuscus* is a moderately large species; the largest specimen examined measured 72.0 mm SL. This species exhibits considerable variation in coloration (see Plates 7D-J), although this can be roughly divided into yellow and dark forms. Thresher (1984) suggested that the species is sexually dimorphic, females being generally dark and males being generally yellow. However, gross examination of gonads of museum specimens in the present study proved inconclusive as to this purported sexual dimorphism. A yellow aquarium specimen from the Great Barrier Reef (illustrated in Plate 7E) changed coloration through an intermediate dark/yellow coloration (similar to Plate 7F) to a uniformly dark coloration over a period of several weeks (pers. obs.), suggesting that there might be an ontogenetic basis for the colourations. There is also a geographic basis for at least some of the colour variation: dark individuals with the upper part of the body and dorsal fin yellow (Plate 7G) are presently known only on the basis of specimens photographed and collected in the southern parts of the Flores and Java Seas (including, Flores and Bali) and off the northern and western coasts of Irian Jaya (near Selat Dampier and Biak). Considering this, and given the relatively extensive geographic range of the species, as well as the presence of geographic variation in certain meristic characters (Tables 5-7), it is highly probable that further studies (particularly field- and aquarium-based studies of live coloration) will provide justification for the subdivision of *P. fuscus* as currently conceived into several species.

Type material could not be found for either *Pseudochromis fuscus* Müller & Troschel (1849) or *P. adustus* Müller & Troschel (1849). Enquiries were made (in 1987 and 1998) to H. Paepke at the Museum für Naturkunde der Humboldt-Universität in Berlin concerning the status of the types. He replied that although catalogue numbers existed for the types, the actual specimens could not be located; however, he was successful in locating the syntypes of *Cichlops cyclophthalmus*, which was described in the same paper. Although Müller & Troschel's descriptions of *P. fuscus* and *P. adustus* lack sufficient diagnostic detail to unquestionably link them with the present species, the figures and descriptions more closely resemble it than they do any other species. Therefore, until the types of *P. fuscus* and *P. adustus* have been located, *P. fuscus* is retained in keeping with common usage.

The identification of Bleeker's syntypes of *Pseudochromis xanthochir* was discussed by Gill (1995: 245), who also designated a lectotype. Although Bleeker (1855a) distinguished *P. xanthochir* from *P. fuscus* on the basis of the presence of dark markings on the caudal fin and on the pectoral-fin base, this is within the range of intraspecific colour variation noted above. All of the specimens identified by Bleeker as *P. xanthochir* are referable to the present species. The identity of *P. xanthochir* has been previously confused; the name has been applied to various species, including *P. cyanotaenia, P. luteus, P. marshallensis, P. ransonneti* and *P. wilsoni*.

De Vis (1885) described *Onar nebulosum* on the basis of an unspecified number of specimens in the Queensland Museum from Murray Id, Torres Straits. McCulloch (1915) redescribed and illustrated one of three syntypes of *O. nebulosum*, which he received on exchange from the Queensland Museum and deposited in the Australian Museum. He noted that De Vis had mistakenly recorded a dorsal-fin

Table 5. Frequency distributions for selected fin-ray counts of *Pseudochromis fuscus* from different localities. UPCR, upper procurrent caudal-fin rays.

	Segmented dorsal rays						Pectoral rays						UPCR			
	25	26	27	28	29	$\bar{x}$	16	17	18	19	20	$\bar{x}$	5	6	7	$\bar{x}$
Sri Lanka	-	1	-	-	-		-	-	-	2	-	19.0	-	1	-	
Andamans	1	6	-	-	-	25.9	-	-	14	-	-	18.0	-	4	3	6.4
Simeuluë	-	9	1	-	-	26.1	-	1	18	1	-	18.0	-	9	1	6.1
Hong Kong	1	5	3	-	-	26.2	-	-	7	10	-	18.6	-	5	4	6.4
Vietnam	-	6	-	-	-	26.0	-	-	5	7	-	18.6	-	4	2	6.3
Mindoro	-	1	-	-	-		-	-	2	-	-	18.0	-	1	-	
Cuyo Ids	3	8	1	-	-	25.8	-	4	20	-	-	17.8	-	11	1	6.1
Sitankai	2	7	1	-	-	25.9	-	1	13	6	-	18.3	1	9	1	6.0
Sabah	-	1	-	-	-		-	-	2	-	-	18.0	-	1	-	
N Sulawesi	1	3	-	-	-	25.8	-	-	6	2	-	18.3	-	3	-	6.0
Palu Bay	-	2	-	-	-	26.0	-	-	2	2	-	18.5	-	2	-	6.0
Saparua	-	5	-	-	-	26.0	-	2	6	2	-	18.0	-	3	2	6.4
Karimunjawa Ids	1	2	-	-	-	25.7	-	-	1	5	-	18.8	-	3	-	6.0
Bali	-	-	1	-	-		-	1	1	-	-	17.5	-	1	-	
Lombok	-	1	-	-	-		-	-	2	-	-	18.0	-	-	1	
Kabaena	-	-	5	5	-	27.5	-	-	20	-	-	18.0	-	10	-	6.0
Flores	-	-	1	6	4	28.4	1	-	21	-	-	17.9	-	11	-	6.0
Coburg Penin.	-	5	-	-	-	26.0	-	-	8	2	-	18.2	-	5	-	6.0
Ashmore Reef	1	2	3	-	-	26.3	-	-	8	3	-	18.3	1	2	3	6.3
Rowley Shoals	1	6	2	-	-	26.1	-	-	8	10	-	18.6	-	8	1	6.1
Dampier Arch.	-	3	1	-	-	26.3	-	-	2	5	1	18.9	-	2	2	6.5
Point Quobba	-	-	1	-	-		-	-	-	2	-	19.0				
Belau	2	8	1	-	-	25.9	-	-	15	7	-	18.3	-	4	7	6.6
Yap	-	4	-	-	-	26.0	-	-	4	4	-	18.5	-	4	-	6.0
Admiralty Ids	-	-	4	1	-	27.2	-	1	7	2	-	18.1	-	5	-	6.0
Madang	-	1	2	-	-	26.7	-	-	6	-	-	18.0	-	3	-	6.0
D'Entrecasteaux Ids	-	-	1	1	-	27.5	-	-	4	-	-	18.0	-	2	-	6.0
Solomons	-	3	8	-	-	26.7	-	3	16	3	-	18.0	1	9	1	6.0
Vanuatu	-	3	1	-	-	26.3	-	-	2	5	1	18.9	-	2	2	6.5
Port Moresby	2	6	3	-	-	26.1	-	-	8	14	-	18.6	-	8	2	6.2
Torres Strait	-	-	1	-	-		-	-	1	1	-	18.5	-	1	-	
Tijou Reef	-	1	-	-	-		-	-	1	1	-	18.5	-	1	-	
Lizard Id	1	7	2	-	-	26.1	-	-	8	12	-	18.6	-	4	6	6.6
Escape Reef	-	2	-	-	-	26.0	-	-	-	3	1	19.3	-	1	1	6.5
Capricorn Group	-	4	-	-	-	26.0	-	-	6	2	-	18.3	-	3	1	6.3
Moreton Bay	-	-	1	-	-		-	-	2	-	-	18.0	-	-	1	

formula of II,17 instead of III,27. McCulloch and Whitley (1925) listed the species in the synonymy of *P. fuscus*. All three syntypes were examined here. The Australian Museum specimen (AMS I.461) has 27 segmented dorsal-fin rays and is referable to the present species, whereas the two Queensland Museum specimens (QM I.100) have only 25 segmented dorsal-fin rays and are referable to *P. marshallensis*. It is argued here that De Vis's segmented dorsal-fin ray count of 17 represents a misprint for 27 and that the description was based on the Australian Museum specimen. This specimen is therefore designated as the lectotype.

The holotype and paratypes of *Pseudochromis aurea* Seale (1910) were deposited in the Philippine Bureau of Science and were destroyed during World War II (Herre, 1953: 2). However, Seale's description is clearly based on the distinctly spotted yellow form of the present species. *Pseudochromis aurea* has previously been confused with various species including *P. luteus, P. marshallensis* and *Cypho zaps*. In order to stabilise the nomenclature of *P. aurea*, AMS I.31423-001, 32.9 mm SL, from Sitankai Id, Philippines, is designated here as the neotype for the species. This specimen is currently listed in the Australian Museum fish collection database as a type specimen of *P. aurea*, a situation that has caused confusion with users of the database. Most notably, Eschmeyer et al. (1998: 168) erroneously listed the specimen as a paratype of the species, overlooking that it was collected by A.W.C.T. Herre in 1931, some 21 years after the description of *P. aurea* was published.

Aoyagi's (1941c) record of *P. olivaceus* from Palau (Belau) is probably based on *P. fuscus*. His description and figure agree in all aspects with *P. fuscus*, except for the presence of a large dark blotch on the operculum. It is possible that this coloration was due to preservation artifact. Unfortunately, Aoyagi's specimen is apparently lost (M. Hayashi, pers.

Table 6. Frequency distributions of counts of scales in lateral series for *Pseudochromis fuscus* from different localities.

	33	34	35	36	37	38	39	40	41	42	43	$\bar{x}$
Sri Lanka	-	-	-	-	-	1	1	-	-	-	-	38.5
Andamans	-	-	-	2	1	4	3	4	-	-	-	38.4
Simeuluë	-	-	3	6	5	6	-	-	-	-	-	36.7
Hong Kong	-	-	-	-	2	7	6	2	-	1	-	38.7
Vietnam	-	-	-	-	1	1	4	4	1	1	-	39.5
Mindoro	-	-	-	1	-	-	1	-	-	-	-	37.5
Cuyo Ids	-	1	1	4	7	6	4	1	-	-	-	37.3
Sitankai	-	-	-	3	4	9	1	3	-	-	-	37.9
Sabah	-	-	-	-	-	-	1	1	-	-	-	39.5
N Sulawesi	-	-	-	2	2	2	2	-	-	-	-	37.5
Palu Bay	-	-	-	-	2	2	-	-	-	-	-	37.5
Saparua	-	-	-	1	1	2	5	1	-	-	-	38.4
Karimunjawa Ids	-	-	-	1	4	-	1	-	-	-	-	37.2
Bali	-	-	-	-	-	1	1	-	-	-	-	38.5
Lombok	-	-	1	1	-	-	-	-	-	-	-	35.5
Kabaena	-	-	-	3	6	2	6	3	-	-	-	38.0
Flores	-	-	1	1	5	2	8	3	2	-	-	38.5
Coburg Penin.	-	-	-	2	2	4	1	-	-	1	-	37.9
Ashmore Reef	-	-	-	-	1	3	2	4	1	-	1	39.4
Rowley Shoals	-	-	-	2	4	2	3	6	1	-	-	38.6
Dampier Arch.	-	-	-	-	-	1	2	4	1	-	-	39.6
Point Quobba	-	-	-	-	-	-	-	1	1	-	-	40.5
Belau	-	1	1	7	1	5	3	4	-	-	-	37.5
Yap	-	-	2	1	1	2	2	-	-	-	-	37.1
Admiralty Ids	-	1	-	5	2	1	1	-	-	-	-	36.5
Madang	-	-	3	-	2	1	-	-	-	-	-	36.2
D'Entrecasteaux Ids	-	-	-	-	1	3	-	-	-	-	-	37.8
Solomons	1	4	2	4	7	3	1	-	-	-	-	36.1
Vanuatu	-	-	-	3	1	2	1	1	-	-	-	37.5
Port Moresby	-	1	-	-	-	11	4	5	1	-	-	38.6
Torres Strait	-	-	-	-	-	1	1	-	-	-	-	38.5
Tijou Reef	-	-	-	-	-	-	-	-	-	1	1	42.5
Lizard Id	-	-	-	1	1	3	5	6	2	1	1	39.5
Escape Reef	-	-	-	-	-	1	1	2	-	-	-	39.3
Capricorn Group	-	-	-	-	1	1	2	1	1	-	-	39.0
Moreton Bay	-	-	-	-	-	-	1	1	-	-	-	39.5

comm.).

ETYMOLOGY: The specific epithet is from the Latin for dark or dusky with reference to the dark colour form of the species.

MATERIAL EXAMINED: SRI LANKA (CEYLON): Colombo, CAS-SU 30814, 1(1), 38.0 mm SL. ANDAMAN IDS: BMNH 1870.8.14.16, 6(4, 46.0-61.1 mm SL), 28.2-61.1 mm SL, BMNH 1889.2.1.3344, 1(1), 56.4 mm SL, BMNH 1889.2.1.3345-6, 2(2), 32.5-34.9 mm SL, RMNH 4630, 1(0). HONG KONG: NE end of Pratas Reef lagoon, AMS I.31416-001, 6(6), 44.6-69.2 mm SL, CAS 60997, 6(3, 57.9-72.0 mm SL), 17.1-72.0 mm SL. VIETNAM: Nhatrang vicinity, N shore of Binhchang Bay, AMS I.31418-001, 6(6), 50.6-58.0 mm SL, CAS 62883, 7(0), 31.9-62.7 mm SL. PHILIPPINES: ANSP 48728, 7(0); Luzon, Lingayen Gulf, Bolinao, AMS I.21900-034, 1(0), 28.0 mm SL; Luzon, Lingayen Gulf, Hundred Ids, LACM 42484-38, 1(0), 34.0 mm SL; Mindoro, off Puerto Galera, LACM 42490-70, 1(1), 61.3 mm SL; Dalaganem Id, USNM 146572, 1(0); Cuyo Ids, NNE side of Bararin Id, USNM 23401, 12(12), 37.7-52.9 mm SL; Palawan, El Nido, YCM P.12092, 1(0), 30.5 mm SL; Palawan, Puerto Princesa, Table Head Reef, USNM 290202, 2(0); Balabac Id, Caxisigan Id, USNM 146571, 1(0); Apo Id, USNM 232046, 1(0); Burias Id, USNM 146565, 1(0); San Bernardino Strait, Southern Biri Id, USNM 146566, 1(0); Ticao Id, USNM 145352, 1(0); Leyte, Cabalian, CAS-SU 28509, 1(0), 52.5 mm SL; Cebu, Mactan Id, USNM 146573, 1(0); Jolo, CAS-SU 28508, 6(0), 57.4-62.8 mm SL, CAS-SU 39032, 1(0), 67.0 mm SL; Sitankai, AMS I.31423-001, 1(1), 32.9 mm SL (neotype of *P. aurea* Seale), AMS I.31423-002, 1(1), 33.0 mm SL, CAS-SU 28507, 8(8), 27.2-61.5 mm SL, CAS-SU 28511, 74(0), 23.0-72.5 mm SL, CAS-SU 28515, 5(0), 18.2-36.1 mm SL, CAS-SU 32962, 6(0), 48.0-77.0 mm SL. SABAH, MALAYSIA: Bodgaya Ids, Bohaydulong Id, WAM P.30412-050, 1(1), 40.4 mm SL. INDONESIA: RMNH 32435, 9(4, 44.8-49.4 mm SL), 39.4-59.6 mm SL (Bleeker specimens of *P. xanthochir*, possibly including a paralectotype); Sulawesi, Manado, RMNH 5959, 1(1), 46.0 mm SL (lectotype of *P. xanthochir* Bleeker); Sulawesi, Bitung, BMNH 1973.12.20.215-

217, 3(3), 39.0-69.0 mm SL; Sulawesi, Palu Bay, BMNH 1973.12.20.218-219, 2(2), 56.0-56.7 mm Sl; Sulawesi, Tomini Gulf, Togian Id, USNM 146583, 1(0); Kabaena Id, Tallabassi Bay, off NW shore of Big Damabawa Islet, USNM 290974, 47(10, 36.5-53.9 mm SL), 15.9-53.9 mm SL; Ceram, Marsegoe Bay, AMS I.18469-178, 2(2), 48.0-49.5 mm SL (cleared and stained); Ceram, Piru Bay, USNM 209699, 4(0); Saparua, Kulor, USNM 210886, 5(5), 29.2-52.5 mm SL; Pulau Pulau Boö, RMNH 20723, 2(0), 29.0-58.0 mm SL; Irian Jawa, Geelvink Bay, ANSP 128859, 1(0), 48.2 mm SL; Simeuluë Id, Sinabang Bay, ZMA 120.08, 21(10, 39.3-63.2), 21.4-63.2 mm SL; Pulau Pulau Batu, Pulau Bai, USNM 20690, 4(0); Pulau Pulau Seribu, Pulau Ajer, USNM 278100, 6(0); Pulau Pulau Seribu, Pulau Putri, BPBM 19523, 1(0), 56.0 mm SL, BPBM 18588, 1(0), 52.0 mm SL, BPBM 19535, 2(0), 52.0-53.0 mm SL; Pulau Pulau Karimunjawa, Mendjangan Id, AMS I.32014-001, 7(3, 42.0-65.0 mm SL), 42.0-65.0 mm SL; Bali, Pulau Menjangan, BPBM 29568, 1(0), 53.0 mm SL, BPBM 31561, 1(1), 49.7 mm SL; Lombok, Gili Air, BPBM 3058, 1(1), 41.2 mm SL; Flores, N of Maumere, Wailiti Reef, BPBM 32178, 1(1), 54.6 mm SL; Flores, Pulubesar, WAM P.29713-019, 8(8), 45.5-58.1 mm SL, WAM P.29713-020, 2(2), 33.4-34.2 mm SL. NORTHERN TERRITORY, AUSTRALIA: Timor Sea, Ashmore Reef, West Id, WAM P.29040-010, 6(6), 37.3-55.2 mm SL; Coburg Peninsula, North Oxley Id, NTM S.10603-038, 22(5, 49.7-60.1 mm SL), 30.0-70.0 mm SL; Coburg Peninsula, Coral Bay, NTM S.10015-016, 2(0), 65.0-73.0 mm SL. WESTERN AUSTRALIA: Timor Sea, Rowley Shoals, Clerke Reef, lagoon at NW end of shoal, WAM P.27658-065, 7(7), 29.6-52.7 mm SL; Timor Sea, Rowley Shoals, Clerke Reef, Bedwell Id lagoon, WAM P.27661-004, 2(2), 47.1-52.2 mm SL; Dampier Archipelago, Rosemary Id, NTM S.10814-028, 1(0), 43.0 mm SL, WAM P.25115-003, 2(2), 55.3-63.7 mm SL, WAM P.25115-004, 2(2), 55.2-58.9 mm SL; Dampier Archipelago, S of Kendrew Id, WAM P.24620-001, 1(0), 59.5 mm SL; Point Quobba, WAM P.27962-003, 1(1), 70.7 mm SL. BELAU (PELEW; PALAU): BMNH 1874.11.9.35, 1(0); Koror Id, 500 m NE of Madmosuk Id, AMS I.31419-001, 5(5), 35.0-47.2 mm SL, CAS 62925, 6(6), 36.2-56.9 mm SL. CAROLINE IDS: Yap Id, BMNH 1873.6.23.17, 1(0); Yap Id, SW side of

Table 7. Frequency distributions of counts of anterior lateral-line scales for *Pseudochromis fuscus* from different localities.

	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	$\bar{x}$
Sri Lanka	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	30.5
Andamans	-	-	-	-	-	-	-	-	-	1	2	-	1	3	4	-	-	-	-	-	29.4
Simeuluë	-	-	-	-	-	-	-	-	-	-	9	8	1	-	-	-	-	-	-	-	27.6
Hong Kong	-	-	-	-	-	-	-	-	-	-	-	1	1	5	5	-	4	-	1	-	31.1
Vietnam	-	-	-	-	-	-	-	-	-	-	-	1	1	1	3	5	-	-	-	-	30.9
Mindoro	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	28.5
Cuyo Ids	1	-	-	-	1	-	1	-	1	3	7	3	4	3	-	-	-	-	-	-	26.8
Sitankai	-	-	-	-	-	-	-	-	-	-	-	-	2	7	4	3	1	1	1	-	31.1
Sabah	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	31.5
N Sulawesi	-	-	-	-	-	-	-	-	-	-	-	2	1	1	2	-	-	-	-	-	29.5
Palu Bay	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	30.0
Saparua	-	-	-	-	-	-	-	-	-	-	-	-	-	7	-	2	1	-	-	-	30.7
Karimunjawa Ids	-	-	-	-	-	-	-	-	-	1	-	-	1	4	-	-	-	-	-	-	29.2
Bali	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	29.5
Lombok	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	27.5
Kabaena	-	-	-	-	1	-	-	4	3	2	5	2	-	2	1	-	-	-	-	-	26.3
Flores	-	-	-	-	-	-	-	2	5	2	1	1	4	2	2	3	-	-	-	-	27.9
Coburg Penin.	-	-	-	-	-	-	-	-	-	-	1	-	2	3	2	1	-	-	1	-	30.4
Ashmore Reef	-	-	-	-	-	-	-	-	-	-	1	1	4	1	4	-	-	-	1	-	30.0
Rowley Shoals	-	-	-	-	-	-	-	-	-	-	-	1	5	5	6	1	-	-	-	-	30.1
Dampier Arch.	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	3	-	-	-	1	31.8
Point Quobba	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	32.0
Belau	-	-	-	-	-	-	-	-	-	-	1	4	1	9	3	2	1	-	1	-	30.1
Yap	-	-	-	-	-	-	-	-	-	-	1	4	1	1	-	-	-	-	-	-	28.3
Admiralty Is	-	-	-	-	-	-	-	-	1	2	1	1	3	2	-	-	-	-	-	-	27.9
Madang	-	-	-	-	-	-	-	1	-	1	3	-	1	-	-	-	-	-	-	-	26.7
D'Entrecasteaux Ids	-	-	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-	26.5
Solomons	-	-	-	-	1	1	-	2	7	4	2	1	2	1	-	1	-	-	-	-	26.0
Vanuatu	-	-	-	-	-	-	-	-	-	-	2	3	1	1	-	1	-	-	-	-	28.6
Port Moresby	-	-	-	-	-	-	-	-	-	-	3	1	5	4	4	4	1	-	-	-	30.0
Torres Strait	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	-	29.5
Tijou Reef	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	33.5
Lizard Id	-	-	-	-	-	-	-	-	-	-	-	3	1	5	1	5	2	2	-	-	30.9
Eseape Reef	-	-	-	-	-	-	-	-	-	-	-	-	1	2	-	1	-	-	-	-	30.3
Capricorn Group	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	-	1	-	-	-	30.8
Moreton Bay	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	29.0

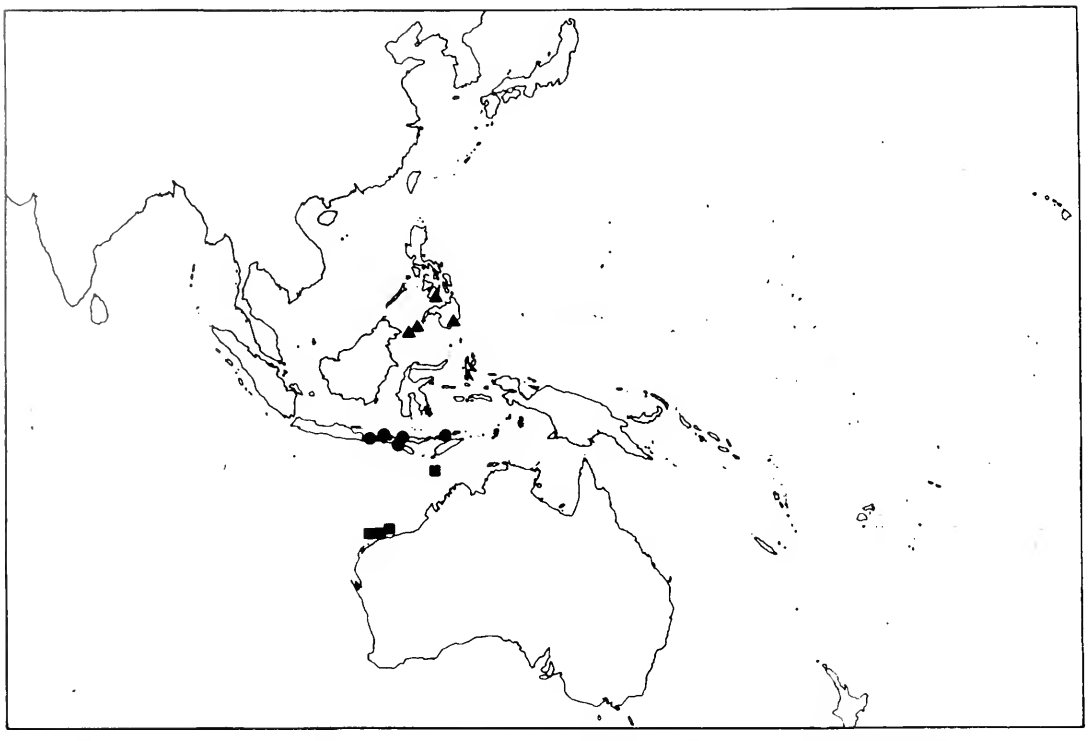

Figure 44. Distributional records for *Pseudochromis howsoni* (squares), *P. moorei* (triangles) and *P. steenei* (closed circles).

Gorror Islet, CAS 62901, 4(4), 25.0-49.4 mm SL; Yap Id, W side of Map Id, CAS 62916, 5(0). PAPUA NEW GUINEA: Hermit Ids, Akib Id, USNM 290691, 11(0); Admiralty Ids, Manus Id, Hayne Harbour, lagoon at Momote airfield, WAM P.27827-035, 9(0), 31.0-51.0 mm SL, WAM P.27828-003, 6(5, 38.0-44.5 mm SL), 23.5-44.5 mm SL; Admiralty Ids, Los Negros Id, USNM 114830, 2(0); Wewak, Muschu Id, USNM 246205, 8(0); Little Pig Id, CAS 65789, 8(0), 28.0-46.5 mm SL; Nagada Harbour, CAS 65779, 12(0), 31.5-47.0 mm SL; Madang Harbour, Kranket Id, AMS I.17089-028, 22(0), BMNH 1974.5.25.944-946, 3(3), 46.8-51.0 mm SL, USNM 290523, 2(0); Saint George's Channel, Keraward Id, USNM 290522, 17(0); D'Entrecasteaux Group, Goodenough Id, WAM P.24915-001, 2(2), 33.2-51.0 mm SL; Port Moresby, AMS I.17262-026, 11(11), 31.5-63.1 mm SL. EASTERN AUSTRALIA: Torres Strait, Murray Id, AMS I.461, 1(1), 48.8 mm SL (lectotype of *O. nebulosum* De Vis); Cape York, N end of Tijou Reef, AMS I.20956-056, 1(0), 20.0 mm SL, QM I.16045, 1(1), 34.2 mm SL; Lizard Id, S end of Coconut Beach, AMS I.19473-081, 28(10, 43.8-60.1 mm SL), 16.6-60.1 mm SL; Eagle Cay, AMS I.21540-047, 3(3), 26.1-32.0 mm SL (cleared and stained); Clack Reef, QM I.15796, 1(0), 57.3 mm SL, QM I.15424, 4(0), 50.8-57.0 mm SL; Arlington Reef, QM I.19114, 1(0), 56.5 mm SL; Big Broadhurst Bay, QM I.13204, 1(0), 63.0 mm SL; Escape Reef, QM I.20767, 2(2), 40.9-58.1 mm SL; Endeavour Reef, ANSP 121982, 5(0), 47.0-52.0 mm SL, ANSP 121984, 4(0), 17.0-22.5 mm SL; Darnley Id, QM I.823, 1(0), 57.0 mm SL; Capricorn Group, One Tree Id, AMS I.20213-011, 3(3), 30.7-62.3 mm SL, AMS I.20575-009, 1(1), 60.0 mm SL (cleared and stained); Swain Reefs, Mystery Cay, AMS I.24545-001, 1(0), 68.0 mm SL; Moreton Bay, QM I.784, 1(1), 52.7 mm SL (holotype of *P. wildii* Ogilby). SOLOMON IDS: Shortland Id, ANSP 91040, 1(0), 53.5 mm SL, BPBM 1221, 1(1), 69.4 mm SL; New Georgia, Munda lagoon, USNM 290401, 18(10, 24.5-28.3 mm SL), 23.0-28.3 mm SL; Russell Ids, AMS IB.6707, 1(0); Florida Id, Upper Purvis Bay, USNM 197197, 1(0). NEW CALEDONIA: Noumea, Ducos Peninsula, USNM 290621, 1(0). VANUATU (NEW HEBRIDES): ANSP 71365, 1(1), 37.0 mm SL; Espiritu Santos, USNM 278158, 1(1), 44.4 mm SL; Espiritu Santos, Polikulo Bay, CAS 60949, 2(2), 37.8-44.8 mm SL; Efate Id, FMNH 17340, 1(1), 65.5 mm SL.

Pseudochromis howsoni Allen

Shelf Dottyback

Figure 44; Plates 8A-B

Pseudochromis sp.; Sainsbury et al., 1985: 338 (list).

Pseudochromis howsoni Allen, 1995: 83, figs 1-2 (type locality: Ashmore Reef, Timor Sea); Allen, 1997: 96, pl. 29-13 (description; distribution; col. fig.); Gill, 1999b: 2563 (key).

DIAGNOSIS: *Pseudochromis howsoni* is distinguished from congeners in having the following combination of characters: palatine tooth patches directed strongly inward behind posterolateral arms of vomerine tooth patch; no dark stripe on upper part of body; dusky to prominent dark bar in front of each anterior nostril; small (smaller than pupil), indistinct to distinct grey to black spot on posterodorsal corner of operculum; caudal fin rounded, becoming strongly emarginate in large specimens; anal fin without broad dark grey-brown (dark grey to black in life) distal stripe; pelvic fins not broadly edged anteriorly with dark grey-brown (dark grey to black in life); and preopercle edge not dark.

DESCRIPTION (based on 30 specimens, 26.5-73.6 mm SL): dorsal-fin rays III,25-27, last 9-26 segmented rays branched (all or all but first 1-2 segmented rays branched in specimens

larger than about 40 mm SL); anal-fin rays III,13-14, last 12-14 segmented rays branched; pectoral-fin rays 17-20; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 5-6; total caudal-fin rays 28-30; scales in lateral series 40-47; anterior lateral-line scales 33-40; anterior lateral line terminating beneath segmented dorsal-fin ray 19-24; posterior lateral-line scales 6-12 + 0-2; scales between lateral lines 2-4; horizontal scale rows above anal-fin origin 13-17 + 1 + 2-4 = 16-20; circumpeduncular scales 20; predorsal scales 16-22; scales behind eye 3-4; scales to preopercular angle 6-9; gill rakers 5-6 + 10-13 = 16-18; pseudobranch filaments 10-14; circumorbital pores 24-34; preopercular pores 11-19; dentary pores 4; posterior interorbital pores 1-2.

Lower lip complete or incomplete with weak to moderate interruption; dorsal and anal fins without distinct scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from posterior AIO to mid AIO pores; opercle with 4-7 distinct serrations, sometimes with additional serration below subopercle junction; teeth of outer ceratobranchial-1 gill rakers well developed on raker tips only; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1 + 1*/1/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1/1 + 1*/1; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray longest or subequal to third; caudal fin rounded, becoming strongly emarginate in larger (greater than about 50 mm SL) specimens; vertebrae 10 + 16; epineurals 15; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth, and 4-6 (at symphysis) to 2-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-3 pairs of curved, caniniform teeth, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-3 rows of small conical teeth, forming chevron; palatine with 1-3 irregular rows of small conical teeth arranged in elongate patch, anterior tip of patch directed medially behind posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 9 specimens, 37.8-73.6 mm SL): head length 21.1-26.7; orbit diameter 6.5-9.5; snout length 5.4-7.2; fleshy interorbital width 4.5-5.6; bony interorbital width 3.2-4.5; body width 11.0-13.6; snout tip to posterior tip of retroarticular bone 13.4-15.6; predorsal length 30.1-34.2; prepelvic length 29.1-34.6; posterior tip of retroarticular bone to pelvic-fin origin 15.9-22.4; dorsal-fin origin to pelvic-fin origin 24.7-29.1; dorsal-fin origin to middle dorsal-fin ray 31.0-34.8; dorsal-fin origin to anal-fin origin 38.6-42.4; pelvic-fin origin to anal-fin origin 27.2-34.0; middle dorsal-fin ray to dorsal-fin termination 23.5-28.1; middle dorsal-fin ray to anal-fin origin 23.6-26.7; anal-fin origin to dorsal-fin termination 30.9-34.7; anal-fin base length 23.3-28.1; dorsal-fin termination to anal-fin termination 15.1-17.5; dorsal-fin termination to caudal peduncle dorsal edge 11.2-12.9; dorsal-fin termination to caudal peduncle ventral edge 18.8-20.5; anal-fin termination to caudal peduncle dorsal edge 19.7-20.8; anal-fin termination to caudal peduncle ventral edge 11.2-13.6; first dorsal-fin spine 1.5-2.5; second dorsal-fin spine 3.8-5.6; third dorsal-fin spine 5.0-8.4; first segmented dorsal-fin ray 9.4-12.2; fourth last segmented dorsal-fin ray 15.4-18.0; first anal-fin spine 1.8-2.7; second anal-fin spine 4.2-6.3; third anal-fin spine 5.9-7.9; first segmented anal-fin ray 9.5-11.1; fourth last segmented anal-fin ray 13.5-16.7; third pectoral-fin ray 12.5-15.8; pelvic-fin spine 8.0-11.4; second segmented pelvic-fin ray 18.8-26.1; caudal-fin length 21.3-26.5.

Live coloration: Juveniles and females (based on photographs of specimens from the southern part of the North West Shelf of Australia and from Ashmore Reef, Timor Sea; Plate 8A): head and body purplish grey to dark grey, sometimes becoming yellow on lower part of head and breast; small (smaller than pupil) dark grey to black spot at posterodorsal corner of operculum; short dark grey to black bar in front of anterior nostril; iris dark reddish grey with blue suboval ring around pupil; scales of nape and upper parts of head and body each with a dark grey to black basal spot; caudal peduncle sometimes yellowish grey to yellow; dorsal and anal fins grey basally, becoming greyish hyaline to hyaline distally; caudal fin purplish grey to greyish yellow, becoming pale grey to hyaline on upper and lower borders; pectoral fins pinkish to greyish hyaline; pelvic fins pale purplish to pinkish grey. Males (based on photographs of specimens from the southern part of the North West Shelf of Australia and from Ashmore Reef, Timor Sea; Plates 8A-B): head and anterior part of body yellow to orange, becoming dark purplish grey on posterior half of body and caudal peduncle; small (smaller than pupil) dark grey to black spot at posterodorsal corner of operculum; short dark grey to black bar in front of anterior nostril; interorbitals yellowish grey; iris dark yellowish grey to bright yellow with blue suboval ring around pupil; scales of nape and upper parts of head and body each with a dark grey to black basal spot; dorsal fin bright yellow to bright orange anteriorly, becoming dark grey to greyish hyaline posteriorly, with bright blue distal margin; anal fin grey basally, becoming greyish hyaline distally; caudal fin dark purplish grey, becoming greyish hyaline posteriorly, with upper and lower borders pale yellowish grey to greyish hyaline; pectoral fins yellowish to orangish hyaline; pelvic fins pale grey to pale pink or yellowish hyaline.

Preserved coloration: pattern similar to live coloration, head and body becoming pale brown to brown (only marginally darker in females and juveniles); dark markings on head and body becoming grey-brown to dark brown (usually darkest on nape and dorsal body scales), though dark opercular spot often becoming indistinct; dark bar in front of anterior nostril becoming dusky brown to dark grey; dorsal and anal fins becoming pale brown to brownish hyaline, usually darker basally; caudal fin pale brown to brownish hyaline, sometimes darker on upper and lower edges; pectoral and pelvic fins pale brown to brownish hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis howsoni* is known from Ashmore Reef, Timor Sea, and the North West Shelf of Australia (Figure 44). Almost all specimens were collected by benthic trawling in 19-84 m. The type specimens, however, were collected using SCUBA from the base of an isolated, one-metre diameter sponge formation on sand-rubble bottom in 23 m.

COMPARISONS: *Pseudochromis howsoni* closely resembles *P. moorei* from the Philippines, *P. quinquedentatus* from northern Australia and *P. steenei* from Indonesia in most morphological details; the four species are distinguished from all other pseudochromines in having, in combination, the palatine tooth patches directed strongly inward behind the posterolateral arms of the vomerine tooth patch, and no dark stripe on the upper part of the body. They are distinguished from each other mainly by coloration characters: whereas *P. howsoni, P. moorei* and *P. steenei* have a dark bar in front of each anterior nostril, it is absent or very diffuse in *P. quinquedentatus; P. quinquedentatus* lacks a dark spot on the posterodorsal corner of the operculum, *P. howsoni* has an indistinct, small (smaller than pupil) dark spot, *P. steenei* has a large (larger than pupil) distinct dark grey to black spot (females) or a large, irregular, dusky grey spot (males), and *P. moorei* has a distinct, large (about equal to eye) dark spot; *P. steenei* has a broad dark grey-brown (dark grey to black in life) stripe on the distal part of the anal fin and on the anterior margins of the pelvic fins, whereas dark stripes are lacking in the remaining species; *P. steenei* has a pale bar extending from behind the eye to the posterior edge of the upper jaw, but this is lacking in the other species; and *P. moorei* has a dark bar along the preopercular edge, whereas this is absent in *P. howsoni* and *P. quinquedentatus*, and present (females) or weakly developed to absent (males) in *P. steenei*. The coloration characters on the head are not always readily apparent in preserved specimens, and separation of *P. howsoni* and *P. quinquedentatus* (which are sympatric in north-western Australia) is often difficult. Adult specimens of *P. quinquedentatus* differ from those of the other species in having a rounded rather than emarginate to strongly emarginate caudal fin; however, small specimens of at least *P. howsoni* (and presumably the remaining two species) also have rounded caudal fins. Moreover, many museum collections include trawled specimens in which the caudal fin is badly damaged.

Pseudochromis howsoni possibly differs from *P. quniquedentatus* in modal counts for certain meristic characters, in particular pectoral-fin rays (modally 18, $\bar{x}$ = 18.4, in *P. howsoni* versus modally 19, $\bar{x}$ = 18.8, in *P. quinquedentatus*), predorsal scales (modally 20, $\bar{x}$ = 19.3, versus modally 17, $\bar{x}$ = 17.5), and lower gill rakers (modally 12, $\bar{x}$ = 11.7, versus modally 11, $\bar{x}$ = 11.0). However, value ranges for all of these characters are identical or near identical in the two species, making the characters difficult to use for diagnostic purposes: pectoral-fin rays 17-20 in both species; predorsal scales 16-22 in *P. howsoni* and 15-22 in *P. quinquedentatus*; and lower gill rakers 10-13 in *P. howsoni* and 10-12 in *P. quinquedentatus* (see also Appendix 1).

REMARKS: *Pseudochromis howsoni* is a moderately large species; the largest examined specimen measured 73.6 mm SL. This species was recently decribed by Allen (1995), who also discussed sexual dimorphism and provided colour photographs of a male and female.

Allen (1995) compared *P. howsoni* with *P. moorei* and *P. steenei*, and in detail only with the latter. However, as noted above, the species is more difficult to distinguish from *P. quinquedentatus*; moreover, the two species occur together in north-western Australia and museum specimens of *P. howsoni* have been misidentified as *P. quinquedentatus*. My attention was drawn to the possibility that two species are involved by P. Last in 1989, who in a letter detailing his field experience with the species off Western Australia noted the following: "The colour morphs appear to be consistent; the yellow headed form [*P. howsoni*] may have a yellow tail in which the outer rays are not elongated (presumably females and juveniles) or a greyish tail with extended rays. The pink-bellied form [*P. quinquedentatus*] may also have a yellowish tail in sub-adults but the tail of larger individuals appears to be greyish; I don't recall seeing elongated caudal rays in this form."

Because of the close similarity of *P. howsoni* and *P. quinquedentatus*, it has not been always possible here to determine which references to the latter species might actually be based on the former.

ETYMOLOGY: The species epithet is for C. Howson, captain of the charter vessel *True North* and owner of North Star Charters of Broome, Western Australia. The type specimens were collected by G.R. Allen while on one of Howson's charter cruises.

MATERIAL EXAMINED: AUSTRALIA: Northern Territory, Ashmore Reef, WAM P.30840-001, 1(1), 73.6 mm SL (holotype), WAM P.30840-004, 59.8 mm SL (paratype); Western Australia, 150 km W of Cape Missiessy, 19°02'S 120°04'E, WAM P.26283-002, 1(1), 61.8 mm SL; Western Australia, NE of Port Hedland, 19°04'06"S 119°00'54"E to 19°04'00"S 119°00'48"E, CSIRO H.2777-01, 2(2), 26.5-49.6 mm SL; Western Australia, 19°04'S 118°46'E, WAM P.28678-001, 2(2), 31.4-54.3 mm SL; Western Australia, 19°40'S 116°43'E, CSIRO CA.3005, 73.3 mm SL; Western Australia, 19°54'S 116°00'E to 19°55'S 116°02'E, BMNH 1982.2.9.8, 1(1), 54.0 mm SL; Western Australia, 19°55'S 116°28'E, CSIRO CA.2921, 1(1), 68.0 mm SL; Western Australia, 19°58'S 116°19'E to 19°59'S 116°18'E, BMNH 1982.2.9.7, 1(1), 51.5 mm SL; Western Australia, 19°59'S 117°04'E, WAM P.28687-001, 3(3), 38.3-44.7 mm SL; Western Australia, 20°00'S 116°05'E, NMV A.5131, 1(1), 59.5 mm SL; Western Australia, 140 km W of Port Hedland (20°00'S 117°16'E), AMS I.22831-039, 2(2), 44.2-65.5 mm SL; Western Australia, 20°02'S 116°06'E, WAM P.27222-005, 2(2), 47.5-53.8 mm SL; Western Australia, 20°48'S 116°00'E to 20°46'S 115°59'E, BMNH 1982.2.9.5-6, 2(2), 41.0-47.7 mm SL (47.7 mm SL specimen subsequently cleared and stained).

***Pseudochromis jamesi* Schultz**

Spot-tailed Dottyback

Figure 45; Plates 8C-D

Pseudochromis jamesi Schultz, 1943: 116, fig. 10 (type locality: Rose Id, American Samoa); Wass, 1984: 12 (Samoa Ids; sexual dimorphism); Kailola, 1987: 243 (list, Trobriand Ids, Papua New Guinea); Paxton et al., 1989: 519 (list; distribution); Gill, 1990b: 128 (description; distribution; sexual dimorphism; colour figs); Gill, 1993: 44 (sexual dimorphism; distribution); Gill & Winterbottom, 1993: 4 (comparison; distribution); Lieske & Myers, 1994: pl. 32,

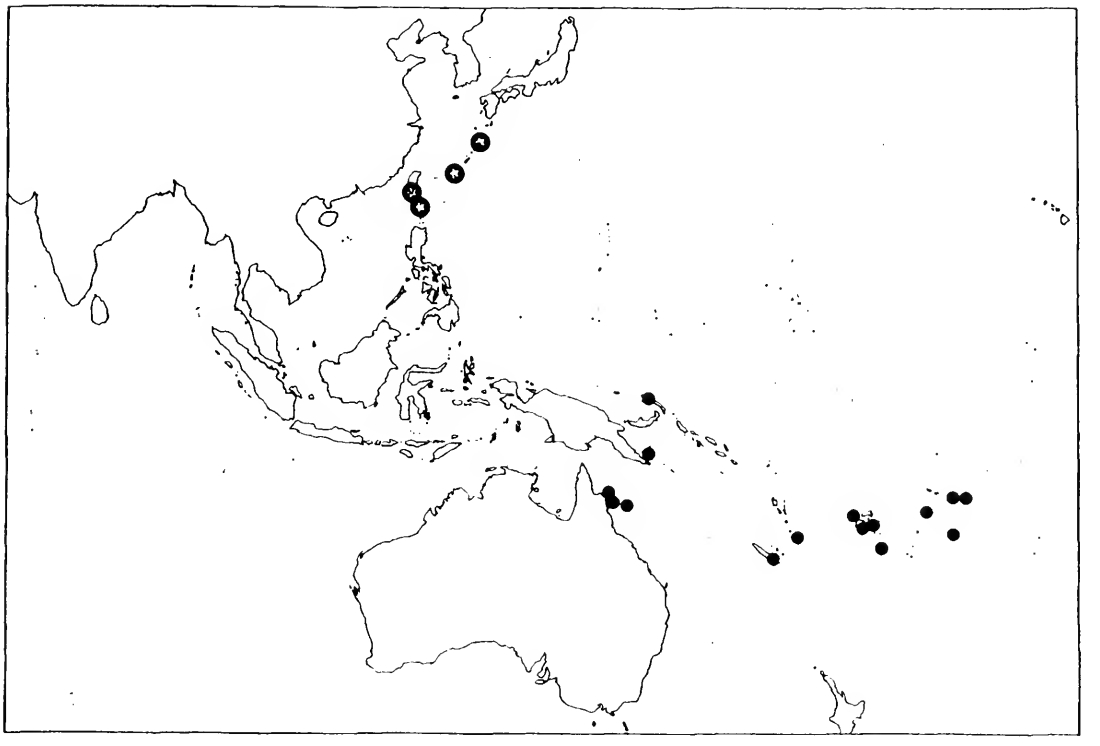

Figure 45. Distributional records for *Pseudochromis jamesi* (closed circles) and *P. luteus* (inset stars).

fig. 13 (colour fig.; habitat and distribution); Gill, 1997: 128 (description; distribution; sexual dimorphism; colour figs); Gill, 1999b: 2565 (key).

DIAGNOSIS: *Pseudochromis jamesi* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 24-26 (usually 25), with all or all but first rays branched; segmented anal-fin rays 13-14 (usually 14); pectoral-fin rays 18-20; circumpeduncular scales 16; anal-fin spines slender and weakly pungent to flexible with the second spine about as stout as the third; and dorsoposterior of caudal peduncle usually with an indistinct to distinct grey to black spot.

DESCRIPTION (based on 34 specimens, 15.3-44.3 mm SL): dorsal-fin rays III,24-26, all or all but first segmented rays branched; anal-fin rays III,13-14, all segmented rays branched; pectoral-fin rays 18-20; upper procurrent caudal-fin rays 6-8; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 29-32; scales in lateral series 34-41; anterior lateral-line scales 27-34; anterior lateral line terminating beneath segmented dorsal-fin ray 19-25; posterior lateral-line scales 4-12 + 0-3; scales between lateral lines 2-4; horizontal scale rows above anal-fin origin 12-14 + 1 + 2-4 = 15-18; circumpeduncular scales 16; predorsal scales 14-18; scales behind eye 2-3; scales to preopercular angle 3-5; gill rakers 3-6 + 10-12 = 13-17; pseudobranch filaments 6-10; circumorbital pores 12-76; preopercular pores 7-36; dentary pores 4; posterior interorbital pores 0-2.

Lower lip varying from incomplete with weak symphyseal interruption to complete; dorsal and anal fins without scale sheaths, although often with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of mid AIO pores to midway between anterior AIO and posterior nasal pores; opercle with 3-7 small, usually inconspicuous serrations; teeth of outer ceratobranchial-1 gill rakers usually either weakly developed or with well-developed teeth confined to raker tips, although sometimes with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1 + 1*/1; dorsal-fin spines slender, tips weakly pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1 + 1/1 + 1*/1; anal-fin spines slender and weakly pungent to flexible, second spine about as stout as third; pelvic-fin spine slender, tip weakly pungent to flexible; second segmented pelvic-fin ray longest; caudal fin rounded, often with posterior margin weakly rounded to truncate; vertebrae 10 + 16; epineurals 13-14; epurals 3.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth, and 5-7 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, conical teeth becoming slightly larger and more curved on middle of jaw; vomer with 2-3 rows of small conical teeth, forming chevron; palatine with 2-3 irregular rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 19 specimens, 27.7-44.3 mm SL): head length 24.6-28.9; orbit diameter 9.1-11.2; snout length 4.9-5.8; fleshy interorbital width 4.1-5.2; bony interorbital

width 2.6-3.4; body width 11.2-14.7; snout tip to posterior tip of retroarticular bone 12.6-14.6; predorsal length 32.9-36.8; prepelvic length 30.3-34.3; posterior tip of retroarticular bone to pelvic-fin origin 17.2-21.7; dorsal-fin origin to pelvic-fin origin 26.1-30.9; dorsal-fin origin to middle dorsal-fin ray 29.4-32.9; dorsal-fin origin to anal-fin origin 39.2-43.3; pelvic-fin origin to anal-fin origin 28.6-33.6; middle dorsal-fin ray to dorsal-fin termination 22.6-26.5; middle dorsal-fin ray to anal-fin origin 25.2-29.3; anal-fin origin to dorsal-fin termination 30.3-32.5; anal-fin base length 21.5-24.3; dorsal-fin termination to anal-fin termination 14.6-17.2; dorsal-fin termination to caudal peduncle dorsal edge 13.0-15.5; dorsal-fin termination to caudal peduncle ventral edge 19.3-21.7; anal-fin termination to caudal peduncle dorsal edge 21.7-24.2; anal-fin termination to caudal peduncle ventral edge 15.4-17.4; first dorsal-fin spine 0.9-3.0; second dorsal-fin spine 3.1-4.7; third dorsal-fin spine 5.3-7.3; first segmented dorsal-fin ray 9.6-12.4; fourth last segmented dorsal-fin ray 12.9-15.2; first anal-fin spine 0.5-2.3; second anal-fin spine 2.6-4.2; third anal-fin spine 4.3-7.4; first segmented anal-fin ray 9.0-11.5; fourth last segmented anal-fin ray 11.9-15.4; third pectoral-fin ray 15.2-18.0; pelvic-fin spine 7.9-11.1; second segmented pelvic-fin ray 17.2-20.3; caudal-fin length 20.7-23.0.

Live coloration: Females (based on photographs of specimens from New Caledonia and Fiji; Plate 8C): head and body dark brown to dark bluish grey, becoming brownish to yellowish or pinkish grey ventrally on body and pale grey on lower half of head and breast; iris yellowish grey to pale orange with blue line above and below pupil; posterior part of caudal peduncle sub-dorsally with large horizontally-elongate black spot, this edged above by bright yellow to white median streak; dorsal and anal fins greyish hyaline, pinkish grey to grey basally; caudal fin grey basally becoming hyaline distally with black and bright yellow caudal peduncle markings extending on to basal part of fin, sometimes with white to bright yellow short stripe on ventral edge of fin base; pectoral fins greyish hyaline; pelvic fins pinkish to greyish hyaline proximally. Males (based on photographs of specimens from the Great Barrier Reef, New Caledonia, Fiji and Tonga; Plate 8D): head and body bright orange-yellow to bright red, becoming more intensely red on posterior part of body; iris bright red with bright blue oval ring around pupil; dorsoposterior part of caudal peduncle sometimes with indistinct to distinct grey sub-dorsal spot and/or white to bright yellow median spot; dorsal and anal fins bright red basally, becoming bright orange to reddish hyaline distally, sometimes with narrow grey to bright blue distal margins; caudal fin bright red with upper and lower posterior margins abruptly reddish hyaline to hyaline; pectoral fins pinkish hyaline; pelvic fins pinkish to reddish hyaline, sometimes with pale blue leading edges.

Preserved coloration: head and body pale orangish brown (males) or brown to dark brown (juveniles and females), paler ventrally; dorsoposterior edge of caudal peduncle with dark grey to black spot (spot absent in some specimens, usually indistinct or absent in males), this edged dorsally by white median spot or streak; dorsal and anal fins hyaline (males) to dusky hyaline (juveniles and females); caudal fin pale orangish brown basally and whitish to hyaline distally (males) or brown basally and dusky hyaline distally (juveniles and females); pectoral fins hyaline; pelvic fins pale brown.

HABITAT AND DISTRIBUTION: *Pseudochromis jamesi* is known only from the south-west Pacific, from New Ireland (Papua New Guinea) and the northern Great Barrier Reef east to Niue and American Samoa (Figure 45). A single specimen in the National Museum of Natural History (USNM 281284) is from W.H. Longley's 1926-27 collection of "Dutch East Indies" fishes. However, Springer (1971: 42) has established that Longley's Indo-Pacific fishes are from three localities: Amboina (Ambon) and Banda Id, Indonesia and Pago Pago, Samoa. The specimen is almost certainly from the latter locality. *Pseudochromis jamesi* has been collected from rock and coral reefs in lagoons and surge areas at depths ranging from 1 to 18 m.

COMPARISONS: This species closely resembles *P. kolythrus* and *P. luteus* in most morphometric and meristic details, particularly in having: 24-26 (usually 25) segmented dorsal-fin rays with all or all but first rays branched; 13-14 (usually 14) segmented anal-fin rays; 16 circumpeduncular scales; and anal fin spines slender and weakly pungent to flexible with the second spine about as stout as the third. The three species can be distinguished by: male live coloration (generally bright orange to bright red in *P. jamesi* and *P. luteus* versus olive-grey with the posterior one-fifth of the body abruptly bright purple in *P. kolythrus*); caudal peduncle coloration (usually with a prominent white or yellow-edged grey to black spot on the dorsoposterior part of the caudal peduncle in *P. jamesi* versus without markings in *P. kolythrus* and *P. luteus*); counts of anterior lateral-line scales (25-26 in *P. kolythrus*, 26-32, usually 28-31 in *P. luteus*, and 27-34, usually 28-31 in *P. jamesi*); posterior extent of anterior lateral line (ending beneath segmented dorsal-fin ray 15-16 in *P. kolythrus*, 17-24, usually 20-23 in *P. luteus*, and 19-25 in *P. jamesi*); numbers of consecutive dorsal-fin pterygiophores inserting in a 1:1 association behind neural spine 4 (4 in *P. kolythrus*, 2-4, usually 3 in *P. luteus*, and 1-2, usually 1 in *P. jamesi*); numbers of pectoral-fin rays (18 in *P. kolythrus*, 16-19, usually 17-18 in *P. luteus*, and 18-20, usually 18-19 in *P. jamesi*); and numbers of lower procurrent caudal-fin rays (6 in *P. kolythrus*, 6-7 in *P. luteus*, and 6-8, usually 7 in *P. jamesi*).

REMARKS: *Pseudochromis jamesi* is a relatively small species; the largest specimen examined measured 44.3 mm SL. Sexual dimorphism in this species has been confirmed from field studies by Wass (1984) and by a superficial examination of gonads. Live colour illustrations of both sexes are provided in Gill (1990b, 1997).

This species is possibly a protogynous hermaphrodite, since juveniles have the female coloration and ovarian remnants were present in almost all of the male specimens examined. Moreover, some specimens had colourations that were more-or-less intermediate between the male and female coloration noted above. Some of the males examined showed interesting variation in gonad structure which deserves further study. For example, a sample from Suva Harbour, Fiji contained five putative males; two of these had a few oocytes and well-developed testes, one had well-developed testes sheathed ventrally with ovarian tissue, and two had well-developed testes on one side of the body and well-developed ovaries on

the other. None of these was examined histologically to determine the functional sexes.

ETYMOLOGY: The specific epithet is for L.P. Schultz's son, James.

MATERIAL EXAMINED: PAPUA NEW GUINEA: New Ireland, N of Kavieng, USNM 290342, 1(1), 44.3 mm SL; Trobriand Ids, Kiriwinna, AMS I.17102-011, 1(1), 41.8 mm SL. GREAT BARRIER REEF, AUSTRALIA: channel between Yonge and Carter Reefs, AMS I.19454-081, 1(1), 40.1 mm SL; Escape Reef, AMS I.22616-045, 1(0), 14.1 mm SL. CORAL SEA, AUSTRALIA: Holmes Reef, North-West Reef, WAM P.29627-030, 2(2), 32.9-38.1 mm SL. VANUATU: Futuna Id, AMS I.20797-023, 3(3), 15.3-32.6 mm SL. NEW CALEDONIA: Solitaire Id, BPBM 27114, 2(2), 40.9-43.4 mm SL; outside barrier reef W of Mato Pass, BPBM 21730, 1(0), 39.0 mm SL. FIJI: Yassawa, Viwa Id, small islet on Viwa Reef, USNM 257254, 2(0); Yassawa Group, Nanuyawata Id, ROM 46745, 3(3), 27.7-42.9 mm SL; Viti Levu, Suva Harbour, Bay of Islands, Bird Id, AMS I.18354-114, 13(13), 34.6-42.3 mm SL, AMS I.18354-116, 1(1), 35.7 mm SL (cleared and stained); Kandavu Id, BMNH 1877.12.10.53, 1(0); Kandavu Id, entrance to Ndaku Bay, USNM 236660, 2(2), 30.2-38.3 mm SL; Moala Group, Matuku Id, USNM 257153, 1(0); Moala Group, Totoya Id, USNM 242115, 2(0); Ono-i-lau Id, outside barrier reef on NW side of island, USNM 242113, 3(0); Vatoa Id, USNM 287651, 2(0), USNM 287680, 1(0). TONGA: Niuatoputapu Id, ANSP 158229, 1(1), 28.0 mm SL, ANSP 158231, 2(2), 38.8-39.0 mm SL. AMERICAN SAMOA: Tutuila, SW side of Fagasa Bay, BPBM 11312, 1(0), 17.0 mm SL; Tutuila, W side of Matalia Point, BPBM 17510, 1(1), 38.0 mm SL; Rose Id lagoon, USNM 115704, 1(1), 29.7 mm SL (holotype), USNM 115705, 1(0) (paratype); USNM 15743, 1(0) (paratype); MCZ 37274, 1(1), 31.9 mm SL (paratype), BPBM 25979, 1(0), 29.0 mm SL. NIUE: NMNZ P.20519, 1(0), 45.4 mm SL.

Pseudochromis kolythrus Gill & Winterbottom

Fig Dottyback

Figures 39, 46

Pseudochromis kolythrus Gill & Winterbottom, 1993: 2, fig. 1 (type locality: Récif Mbere, N of Passe de Dumbéa, New Caledonia); Gill, 1999b: 2565 (key).

DIAGNOSIS: *Pseudochromis kolythrus* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 25, with all rays branched; segmented anal-fin rays 14; anterior lateral-line scales 25-26, terminating beneath segmented dorsal-fin ray 15-16; circumpeduncular scales 16; and fin spines slender and weakly pungent.

DESCRIPTION (based on one specimen, 37.7 mm SL): dorsal-fin rays III,25, all segmented rays branched; anal-fin rays II,14, all segmented rays branched; pectoral-fin rays 18; upper procurrent caudal-fin rays 6; lower procurrent caudal-fin rays 6; total caudal-fin rays 29; scales in lateral series 37; anterior lateral-line scales 25-26; anterior lateral line terminating beneath segmented dorsal-fin ray 15-16; posterior lateral-line scales 5 + 0; scales between lateral lines 4; horizontal scale rows above anal-fin origin 12-13 + 1 + 3 = 16-17; circumpeduncular scales 16; predorsal scales 15; scales behind eye 2; scales to preopercular angle 3; gill rakers 3 + 11 = 14; pseudobranch filaments 7; circumorbital pores 17-23; preopercular pores 8-9; dentary pores 4; posterior interorbital pores 1.

Lower lip incomplete with weak symphyseal interruption; dorsal and anal fins without scale sheaths, although with several intermittent scales overlapping fin bases; predorsal scales extending anteriorly to anterior AIO pores; opercle with 6 small, usually inconspicuous serrations; teeth of outer ceratobranchial-1 gill rakers well developed only on distal halves or tips of rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1 + 1; dorsal-fin spines slender and weakly pungent; anterior anal-fin pterygiophore formula 2/1 + 1/1/1 + 1/1; anal-fin spines slender and weakly pungent, first spine much less stout than second; pelvic-fin spine slender and weakly pungent; second segmented pelvic-fin ray longest; caudal fin rounded, often with posterior margin weakly rounded to truncate; vertebrae 10 + 16; epineurals 13; epurals 3.

Upper jaw with 5 pairs of curved, enlarged caniniform teeth, and 5-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, conical teeth becoming slightly larger and more curved on middle of jaw; vomer with 2-3 rows of conical teeth, forming chevron; palatine with 3-4 irregular rows of small conical teeth arranged in triangular patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth

Figure 46. *Pseudochromis kolythrus*, ROM 65061, 37.7 mm SL, holotype, Récif Mbere, New Caledonia. (Photo by P. Crabb

patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL: head length 26.3; orbit diameter 9.8; snout length 5.6; fleshy interorbital width 4.5; bony interorbital width 2.7; body width 13.3; snout tip to posterior tip of retroarticular bone 20.4; predorsal length 34.5; prepelvic length 34.0; posterior tip of retroarticular bone to pelvic-fin origin 20.4; dorsal-fin origin to pelvic-fin origin 28.4; dorsal-fin origin to middle dorsal-fin ray 29.2; dorsal-fin origin to anal-fin origin 39.3; pelvic-fin origin to anal-fin origin 35.8; middle dorsal-fin ray to dorsal-fin termination 23.3; middle dorsal-fin ray to anal-fin origin 25.2; anal-fin origin to dorsal-fin termination 30.5; anal-fin base length 22.5; dorsal-fin termination to anal-fin termination 15.4; dorsal-fin termination to caudal peduncle dorsal edge 12.7; dorsal-fin termination to caudal peduncle ventral edge 19.1; anal-fin termination to caudal peduncle dorsal edge 22.0; anal-fin termination to caudal peduncle ventral edge 13.8; first dorsal-fin spine 1.6; second dorsal-fin spine 4.0; third dorsal-fin spine 7.2; first segmented dorsal-fin ray 11.1; fourth last segmented dorsal-fin ray 15.9; first anal-fin spine 3.4; second anal-fin spine 6.1; first segmented anal-fin ray 10.3; fourth last segmented anal-fin ray 15.1; third pectoral-fin ray 17.5; pelvic-fin spine 11.4; second segmented pelvic-fin ray 19.9; caudal-fin length 23.6.

Live coloration (based on notes taken by R. Winterbottom immediately after capture): head and anterior four-fifths of body olive-grey, remainder of body bright purple.

Preserved coloration: head and body brown, paler on snout, lips, ventral part of head, and abdomen; posteroventral part of orbital rim dusky grey-brown; caudal peduncle pale yellowish brown; dorsal fin hyaline with scattered grey-brown melanophores, these densest on basal third of fin; anal fin hyaline, narrowly greyish brown on distal and proximal edges of fin; caudal fin pale yellow basally, becoming white centrally; outside white area, caudal fin with broad dusky grey-brown convex mark, this curving from anterodorsal and anteroventral edges of fin to central part of middle rays; behind curved mark, caudal fin hyaline with scattered grey-brown melanophores; pectoral fins hyaline; pelvic fins hyaline, with anterior, posterior and distal margins narrowly grey-brown.

HABITAT AND DISTRIBUTION: *Pseudochromis kolythrus* is known only from the holotype collected from a cave in a reef dropoff in the 18.3-30.5 m depth range at Récif Mbere, New Caledonia (Figure 39).

COMPARISONS: This species closely resembles *P. jamesi* and *P. luteus* in most meristic and morphometric values. Characters distinguishing the three species are discussed under *Comparisons* for *P. jamesi*.

REMARKS: This species is known only from the holotype. The holotype is unique among pseudochromines in having only two anal-fin spines, owing to the presence of one rather than two supernumerary spines on the first anal-fin pterygiophore. However, as noted by Gill & Winterbottom (1993: 4), anal-fin spines are weakly ossified in this and related species (members of the *P. tapeinosoma* complex), and the absence of a supernumerary spine may be due to damage or developmental anomaly rather than being typical for the species.

ETYMOLOGY: The specific epithet is a noun in apposition derived from the Greek *kolythron*, a ripe fig, in allusion to the olive-grey live coloration, with the purple representing the split skin of the ripe fig exposing the interior.

MATERIAL EXAMINED: NEW CALEDONIA: N of Passe Dumbéa, Récif Mbere (22°19'10"S 167°12'45"E), ROM 65061, 1(1), 37.7 mm SL (holotype).

***Pseudochromis kristinae* sp. nov.**
Lipstick Dottyback
Figure 47; Plate 8E

Pseudochromis natalensis [*non* Regan, 1916]; Lubbock, 1977: 10, pls 1e and 3f (description and distribution in part; black and white and colour figs); Smith, 1986: 541 (description and distribution in part).

Pseudochromis tauberi [*non Pseudochromis tauberae* Lubbock, 1977]; Smith, 1980: 176 (Maputaland, South Africa).

Pseudochromis tauberae [*non* Lubbock, 1977]; Smith, 1986: 541, pl. 46 (description and distribution in part; South Africa; colour fig.); Lieske & Myers, 1994: pl. 32, fig. 7 (colour fig.).

Pseudochromis sp.; Heemstra in Smith & Heemstra, 1995: x (description; distribution).

HOLOTYPE: BMNH 1975.2.12:19, 69.9 mm SL, Kenya, Mombasa, Fort Jesus, silt covered rocks with holes and ledges, 15-25 m, R. Lubbock and M. Stewart-Moore, 9 December 1973.

PARATYPES: BMNH 1975.2.12:14-15, 2: 38.3-43.6 mm SL, Kenya, Patta Id, Pazarli Ridge, Congoni Channel, large coral boulders on rubble, 5-6 m, R. Lubbock and M. Stewart-Moore, 30 December 1973; BMNH 1975.2.12:20-24, 5: 26.7-47.2 mm SL, Kenya, Mombasa, Ras Kisauni, silt covered rocks with holes and ledges, 5-25 m, R. Lubbock and M. Stewart-Moore, 20 December 1973; BMNH 1975.2.12:16-18, 3: 41.6-51.0 mm SL, same data as holotype; LACM 31005-45, 4: 37.3-44.9 mm SL (44.9 mm SL specimen subsequently cleared and stained), Kenya, Mombasa, N side of Mombasa Id, Tudor Creek (4°02'S 39°41'E), P. Saw, 10 September 1970; RUSI 3610, 1: 47.1 mm SL, Tanzania, Zanzibar, J.L.B. and M.M. Smith, September 1952; SMF 12659, 2: 41.0-54.9 mm SL, Mozambique, Pinda Reef, J.L.B. and M.M. Smith, July/August 1950; RUSI 46567, 2: 48.7-56.1 mm SL, Mozambique, Ponta Mamoli (26°42'S 32°54'E), P.C. Heemstra, 30 June 1994; BPBM 27335, 1: 53.2 mm SL, South Africa, Natal, off Sodwana Bay, reef in 12 m, rotenone, J.E. Randall, M. Smale and R. van der Elst, 18 April 1979; RUSI 76-10, 2: 52.4-58.7 mm SL, South Africa, Natal, off Sodwana Bay, R. Winterbottom et al., 24 July 1979; RUSI 9806, 1: 53.8 mm SL, South Africa, Natal, Sodwana Bay, P.C. Heemstra, J.E. Randall and G.R. Allen, 19 April 1979; RUSI 9933, 1: 36.0 mm SL, South Africa, Natal, Sodwana Bay, P.C. Heemstra et al., 22 April 1979; ROM 72058, 2: 40.0-45.6 mm SL, Comoro Ids, 100 m N of Isle Gombé-Doume (12°44'36"S 45°13'30"E), live coral (*Pocillipora, Seriatopora* and *Meandrina*), coral rubble, sand and silt bottom with 3-5 m, R. Winterbottom, C. Buxton, P. Benjamin

and W. Holleman, 11 November 1988; ROM 72059, 2: 45.1-45.6 mm SL, Federal Islamic Republic of Comoro, Moheli, bay on S coast, 12°21'15"S 43°40'00"E, fine cand/silt bottom at base of vertical wall with numerous caves, 9-26.5 m, R. Winterbottom and W. Holleman, 27 November 1988; USNM 212281, 6: 41.5-48.2 mm SL, Mozambique Channel, 16°21'S 43°59'E, 27 m, L. Knapp, 16 October 1964; MNHN B.2692, 1: 54.8 mm SL, Madagascar, Diego Suarez, M. Pras; AMS I.28113-074, 1: 42.2 mm SL, Madagascar, Nosy Bé, Andilana Beach, 100 m W of hotel, 50 m offshore (14°43'S 50°57'E), around coral bommies on sand flat with turtle grass, 0.3-2.5 m, J. Paxton, B. Collette, D. Cohen, E. Anderson, J. Nielsen and K. Sulak, 9 November 1988.

DIAGNOSIS: *Pseudochromis kristinae* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 25-27, usually 26; segmented anal-fin rays 14-16, usually 15; scales in lateral series 39-44; anterior lateral-line scales 29-35; circumpeduncular scales 18-20; total caudal-fin rays 30-33, usually 31; and opercular flap without dark spot.

DESCRIPTION (based on 37 specimens, 26.7-69.9 mm SL; minimum and maximum value ranges given first for all type specimens, followed, where different, by values for holotype enclosed in parentheses): dorsal-fin rays III,25-27 (III,26), all or all but first segmented rays branched; anal-fin rays III,14-16 (III,15), all segmented rays branched; pectoral-fin rays 16-19 (19/19); upper procurrent caudal-fin rays 7-8 (8); lower procurrent caudal-fin rays 6-8 (7); total caudal-fin rays 30-33 (33); scales in lateral series 39-44 (43/42); anterior lateral-line scales 29-35 (35/30); anterior lateral line terminating beneath segmented dorsal-fin ray 16-22 (19/17); posterior lateral-line scales 0-14 + 0-3 (8 +1/9 + ?); scales between lateral lines 3-4 (4/3); horizontal scale rows above anal-fin origin 12-15 + 1 + 2-4 = 16-20 (13 + 1 + 3/12 + 1 + 4); circumpeduncular scales 18-20 (20); predorsal scales 16-24 (21); scales behind eye 2-4 (3); scales to preopercular angle 3-7 (6); gill rakers 4-7 + 11-13 = 15-18 (5 + 12); pseudobranch filaments 7-12 (10); circumorbital pores 23-58 (45/37); preopercular pores 9-27 (27/27); dentary pores 4; posterior interorbital pores 1-2 (2).

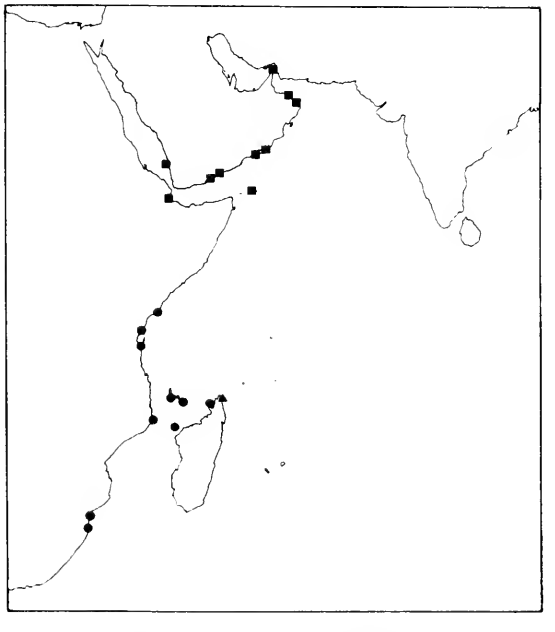

Figure 47. Distributional records for *P. kristinae* (closed circles), *P. kristinae* + *P. madagascariensis* (triangle) and *P. nigrovittatus* (squares).

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from mid AIO pores to posterior nasal pores; opercle with 3-5 usually relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed on raker tips only, although sometimes with small teeth running most of rakers lengths; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1 + 1*/1 or S/S/S + 3/1 + 1/1/1/1/1/1/1 + 1 (S/S/S + 3/1 + 1/1/1/1/1/1/1 + 1); dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1/1/1 + 1/1; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine stout and pungent; second or third segmented pelvic-fin ray longest; caudal fin rounded to truncate or emarginate; vertebrae 10 + 16; epineurals 13-14 (14); epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-3 rows of small conical teeth, forming chevron; palatine with 1-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 15 specimens, 26.7-69.9 mm SL): head length 22.2-27.8 (22.2); orbit diameter 7.0-11.6 (7.0); snout length 5.5-6.5 (5.9); fleshy interorbital width 4.3-5.6 (4.3); bony interorbital width 3.0-3.7 (3.0); body width 11.7-13.9 (12.2); snout tip to posterior tip of retroarticular bone 12.8-16.1 (12.9); predorsal length 29.6-39.3 (29.6); prepelvic length 28.9-34.8 (28.9); posterior tip of retroarticular bone to pelvic-fin origin 17.9-21.7 (17.9); dorsal-fin origin to pelvic-fin origin 27.2-31.6 (27.2); dorsal-fin origin to middle dorsal-fin ray 32.2-38.8 (37.8); dorsal-fin origin to anal-fin origin 39.7-43.2 (41.5); pelvic-fin origin to anal-fin origin 26.6-34.9 (29.3); middle dorsal-fin ray to dorsal-fin termination 22.5-26.5 (26.5); middle dorsal-fin ray to anal-fin origin 26.9-30.2 (28.2); anal-fin origin to dorsal-fin termination 33.2-38.3 (38.3); anal-fin base length 24.6-31.8 (31.8); dorsal-fin termination to anal-fin termination 15.4-18.1 (16.5); dorsal-fin termination to caudal peduncle dorsal edge 10.0-12.2 (11.0); dorsal-fin termination to caudal peduncle ventral edge 18.4-21.2 (19.0); anal-fin termination to caudal peduncle dorsal edge 19.7-22.6 (20.5); anal-fin termination to caudal peduncle ventral edge 10.8-14.6 (12.0); first dorsal-fin spine 1.5-3.0 (2.7); second dorsal-fin spine 4.3-6.0 (5.2); third dorsal-fin spine 6.6-9.7 (8.6); first segmented dorsal-fin ray 11.7-15.3 (15.3); fourth last segmented dorsal-fin ray 14.0-19.9 (19.9); first anal-fin spine 1.6-3.0 (2.1); second anal-fin spine 5.0-6.8 (5.3); third anal-fin spine 6.2-8.2 (6.2);

first segmented anal-fin ray 10.6-12.2 (damaged); fourth last segmented anal-fin ray 13.1-16.2 (16.2); third pectoral-fin ray 14.7-17.8 (14.7); pelvic-fin spine 8.6-10.4 (9.0); second segmented pelvic-fin ray 18.5-25.0 (25.0); caudal-fin length 22.4-26.2 (25.6).

Live coloration (based on photographs of specimens from Kenya, Mozambique, South Africa and the Comores Ids, and on colour description provided by Lubbock, 1977; Plate 8E): head and body light olive to olive or greyish pink, paler ventrally, sometimes becoming mustard yellow on anterior part of body and head; specimens larger than about 40 mm SL usually with dark blue spot on anterior part of opercle immediately behind dorsal edge of preopercle, this edged posteriorly with black; operculum and cheeks usually with faint blue spots and irregular markings; posterior margin of orbit dark grey; dark grey stripe from snout to anterior rim of orbit present in large specimens; lips and snout sometimes pinkish grey to bright red; iris pale yellow to bright red or brown, with green to blue suboval ring around pupil; scales of body each with bright blue blue to dark blue basal spot, these sometimes indistinct (particularly in small specimens) and confined to dorsoanterior part of flanks; dorsal fin reddish pink or pinkish hyaline to bluish or yellowish hyaline, bluish olive basally in large specimens, usually with rows of red or yellow spots and lines and blue to grey distal margin; anal fin reddish pink to olive hyaline or olive, with rows of red to faint red or blue spots and lines and blue to grey distal margin; caudal fin reddish pink or greenish yellow to olive basally, remainder of fin reddish pink or greenish yellow; pectoral fins pinkish hyaline to hyaline; pelvic fins bluish hyaline to pinkish hyaline or hyaline.

Preserved coloration: pattern similar to live coloration, head and body becoming yellow-brown to brown or olive, paler ventrally; dark blue, black-edged spot on anterior part of opercle remains, becoming dark grey to dark brown; dusky grey stripe from anterior edge of eye to snout tip usually present; posterior part of orbital rim dark grey; blue spots on body scales remain, becoming brown to dark brown; dorsal and anal fins brownish hyaline, usually darker basally; caudal fin brown basally, becoming dusky hyaline posteriorly and hyaline to pale brown dorsally and ventrally; pectoral fins hyaline; pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis kristinae* is known only from East Africa, Madagascar and the Comores Ids (Figure 47). It has been collected from coral and rock areas at depths ranging from 0.3 to 25 m.

COMPARISONS: *Pseudochromis kristinae* is similar in morphology to *P. natalensis, P. madagascariensis* and *P. tauberae*; the four species have been confused in recent literature as either *P. natalensis* or *P. tauberae*. They are readily distinguished from each other by the following meristic characters (see Appendix 1): segmented dorsal-fin rays (25-26, usually 26 in *P. kristinae*, 26-27 in *P. madascariensis*, 26-28, usually 27 in *P. natalensis*, and 28-30, usually 29 in *P. tauberae*); segmented anal-fin rays (14-16, usually 15 in *P. kristinae*, 16-17 in *P. madagascariensis*, 16-18, usually 17 in *P. natalensis*, and 15-17, usually 16 in *P. tauberae*); scales in lateral series (39-44 in *P. kristinae*, 41-45 in *P. madagascariensis*, 41-50, usually 44-46 in *P. natalensis*, and 37-44, usually 40-42 in *P. tauberae*); anterior lateral-line scales (29-35 in *P. kristinae*, 32-36 in *P. madagascariensis*, 34-41 in *P. natalensis*, and 28-37 in *P. tauberae*); and total caudal-fin rays (30-33, usually 31 in *P. kristinae*, 32-34 in *P. madagascariensis*, 29-32 in *P. natalensis*, and 30-33 in *P. tauberae*). The four species also differ in the pattern of insertion of anterior dorsal-fin pterygiophores between neural spines. Numbers of consecutive pterygiophores inserting with a 1:1 association with interneural spaces immediately behind neural spine 4 vary from 3-5, usually 4 in *P. kristinae*, 4-5, usually 5 in *P. madagascariensis*, 2-5, usually 4 in *P. natalensis*, and 0-1 in *P. tauberae*. Large specimens (greater than about 40 mm SL) of *P. kristinae, P. madagascariensis* and *P. natalensis* differ from *P. tauberae* in usually having a dark grey to black (dark blue edged posteriorly in black in life) spot on the anterior part of the opercle.

REMARKS: *Pseudochromis kristinae* is a moderately large species; the largest specimen examined measured 69.9 mm SL. This species has been previously confused with *P. natalensis* and *P. tauberae*. The descriptions of *P. natalensis* provided by Lubbock (1977) and Smith (1986) are composite, based on specimens of *P. kristinae, P. madagascariensis* and *P. natalensis*. The colour illustration of *P. natalensis* provided by Lubbock (1977) is of *P. kristinae*; his black and white photograph is of the holotype of *P. kristinae*.

ETYMOLOGY: The specific epithet is for my wife, Kristin Marie ("Molly") Gill, in appreciation of her love, encouragement and support.

MATERIAL EXAMINED (in addition to above type material): ZANZIBAR: RUSI 48827 (in part; tags "Z 829", "Z 796" and "Z 1045"), 3 (0). MOZAMBIQUE: Malongane, RUSI 50566, 8(0), 45.2-52.2 mm SL.

Pseudochromis leucorhynchus **Lubbock**
White-nosed Dottyback
Figure 33; Plate 8F; Table 8

Pseudochromis leucorhynchus Lubbock, 1977: 6, pls 2b and 3b (type locality: Shela, Lamu Id, Kenya); Gill & Mee, 1993: 55, fig. 3, tab. 1 (habitat and distribution; geographic variation; colour fig.); Debelius, 1993: 113 (colour fig.); Gill & Randall, 1994: 16 (key); Randall, 1995: 141, figs 333-334 (description; distribution; colour figs); Debelius, 1996: 113 (colour fig.); Debelius, 1998: 70 (colour fig.).

DIAGNOSIS: *Pseudochromis leucorhynchus* is distinctive within the genus in having the following combination of characters: segmented dorsal-fin rays 28-32, with all or all but the first 1-2 rays branched; segmented anal-fin rays 17-20; circumpeduncular scales 16-20; dorsal-fin origin to pelvic-fin origin 22.7-27.1 % SL; and head and body generally pale brown with darker brown edging on body scale margins and a dark grey to dark blue (dark grey to dark brown in preservative) spot on opercular flap.

DESCRIPTION (based on 19 specimens, 29.5-78.8 mm SL): dorsal-fin rays III,28-32, all or all but first 1-2 segmented rays

branched; anal-fin rays III,17-20, all or all but first segmented rays branched; pectoral-fin rays 17-19; upper procurrent caudal-fin rays 7-8; lower procurrent caudal-fin rays 6-8; total caudal-fin rays 30-33; scales in lateral series 41-47; anterior lateral-line scales 29-36; anterior lateral line terminating beneath segmented dorsal-fin ray 18-24; posterior lateral-line scales 5-12 + 0-2; scales between lateral lines 3-5; horizontal scale rows above anal-fin origin 12-16 + 1 + 2-4 = 16-20; circumpeduncular scales 16-20; predorsal scales 17-22; scales behind eye 2-4; scales to preopercular angle 4-6; gill rakers 4-7 + 10-12 = 14-18; pseudobranch filaments 8-11; circumorbital pores 23-44; preopercular pores 10-25; dentary pores 4; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without distinct scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of mid AIO pores to midway between AIO and posterior nasal pores; opercle with 3-5 small to relatively large serrations; teeth of outer ceratobranchial-1 gill rakers usually either weakly developed or well developed on raker tips only, although well-developed teeth often run most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1 + 1*/1; dorsal-fin spines relatively stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1 + 1*; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout and pungent; second segmented pelvic-fin ray longest, sometimes subequal to third; caudal fin rounded, sometimes only slightly rounded to truncate posteriorly; vertebrae 10 + 16; epineurals 16-18; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 2-3 rows of small conical teeth, forming chevron; palatine with 2-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 13 specimens, 29.5-78.8 mm SL): head length 21.5-27.5; orbit diameter 6.0-10.2; snout length 4.8-6.8; fleshy interorbital width 4.6-5.2; bony interorbital width 2.6-3.6; body width 9.7-12.2; snout tip to posterior tip of retroarticular bone 11.2-13.9; predorsal length 26.8-34.1; prepelvic length 27.7-31.9; posterior tip of retroarticular bone to pelvic-fin origin 16.8-20.7; dorsal-fin origin to pelvic-fin origin 22.7-27.1; dorsal-fin origin to middle dorsal-fin ray 32.7-36.1; dorsal-fin origin to anal-fin origin 36.8-41.8; pelvic-fin origin to anal-fin origin 28.1-33.0; middle dorsal-fin ray to dorsal-fin termination 25.4-32.2; middle dorsal-fin ray to anal-fin origin 23.4-27.3; anal-fin origin to dorsal-fin termination 35.0-41.1; anal-fin base length 28.7-34.6; dorsal-fin termination to anal-fin termination 13.2-16.7; dorsal-fin termination to caudal peduncle dorsal edge 9.1-11.2; dorsal-fin termination to caudal peduncle ventral edge 16.8-19.0; anal-fin termination to caudal peduncle dorsal edge 18.4-20.4; anal-fin termination to caudal peduncle ventral edge 10.8-11.9; first dorsal-fin spine 1.4-2.7; second dorsal-fin spine 2.8-5.1; third dorsal-fin spine 5.0-7.5; first segmented dorsal-fin ray 9.2-11.9; fourth last segmented dorsal-fin ray 13.9-17.4; first anal-fin spine 1.6-2.8; second anal-fin spine 3.4-6.1; third anal-fin spine 4.4-6.6; first segmented anal-fin ray 7.6-10.6; fourth last segmented anal-fin ray 12.5-16.3; third pectoral-fin ray 12.3-14.9; pelvic-fin spine 5.6-8.9; second segmented pelvic-fin ray 12.9-17.7; caudal-fin length 22.5-29.1.

Live coloration (based on photographs of specimens from Kenya and Oman, and field notes provided by J.K.L. Mee; Plate 8F): head and body either yellowish brown to dark olive, paler ventrally, and paler to reddish brown posteriorly, or bright yellow; dark grey stripe extending from middle of upper lip to eye, this bordered dorsally by thin pale grey to white median stripe; indistinct dusky stripe extending from behind eye to upper edge of preopercle; large dark grey to dark blue spot on opercular flap, this bordered posteriorly with gold; iris brown to orange-red with turquoise suboval ring around pupil; edges of body scales pale bluish grey to olive, these forming indistinct reticulated pattern; dorsal and anal fins bright yellow to reddish brown basally, becoming bright yellow to olivish hyaline distally, with several rows of pale blue spots and streaks on basal portion and narrow blue distal margin; caudal fin olive to bright yellow, sometimes with narrow blue distal margin; pectoral fins hyaline; pelvic fins pale olive to hyaline.

Preserved coloration: pattern similar to live coloration, head and body becoming pale yellowish brown to brown; pale grey

Table 8. Frequency distributions for selected meristic characters of Kenyan and Omani specimens of *Pseudochromis leucorhynchus*.

	Segmented anal rays					Scales in lateral series							
	17	18	19	20	$\bar{x}$	41	42	43	44	45	46	47	$\bar{x}$
Kenya	5	6	-	-	17.5	2	4	10	4	1	1	-	43.0
Oman	-	4	3	1	18.6	-	-	2	1	7	4	2	45.2

	Anterior lateral-line scales									Scales between lateral lines			
	29	30	31	32	33	34	35	36	$\bar{x}$	3	4	5	$\bar{x}$
Kenya	1	2	9	7	2	1	-	-	31.5	3	18	1	3.9
Oman	-	-	-	-	2	2	2	5	34.9	7	4	-	3.4

to white stripe on snout becoming less distinct; dark grey to dark blue spot on opercular flap becoming dark grey to dark brown; pale bluish grey to olive scale margins becoming greyish brown to brown; dorsal and anal fins becoming greyish brown, pale blue markings becoming pale grey; caudal fin becoming pale brown to brown, usually darker basally; pectoral and pelvic fins becoming pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis leucorhynchus* is known from the vicinity of Lamu in Kenya to the central coast of Oman (Figure 33). It has been observed (Gill & Mee, 1993) and collected from around live and dead coral rocks at depths ranging from less than 1 m to 8 m.

COMPARISONS: The live and preserved colourations of *Pseudochromis leucorhynchus* are distinctive; in particular, the combination of a dark spot on the opercular flap with a basically pale brown (bright yellow to dark olive in life) head and body, and darker brown edging on the body scale margins is unique within the Pseudochrominae. In addition, the combination of 28-32 segmented dorsal-fin rays with all or all but the first ray branched, 17-20 segmented anal-fin rays, 16-20 circumpeduncular scales, and an incomplete lower lip distinguishes *P. leucorhynchus* from all but a few species that otherwise differ markedly in coloration and/or general body shape.

REMARKS: *Pseudochromis leucorhynchus* is a moderately large species; the largest specimen examined measured 78.8 mm SL. Gill & Mee (1993: 55) noted that there are two colour forms of this species, an olive form and a bright yellow form. Live colour photographs of the olive form are given by Lubbock (1977), Gill & Mee (1993), Debelius (1993, 1996, 1998) and Randall (1995), and of the bright yellow form by Randall (1995).

Gill & Mee (1993: 55, tab. 1) noted that specimens of *P. leucorhynchus* from Oman tended to have more segmented anal-fin rays, more anterior lateral-line scales, more scales in lateral series, and fewer scales between lateral lines than those from Kenya, but that these differences may have reflected the small numbers of specimens available to them from the two areas (two and 11, respectively). Six additional Omani specimens were located in the present study; these specimens confirm the geographic variation in meristic characters noted by Gill & Mee (Table 8). As noted by Gill & Mee, the possibility that this variation is worthy of separate species status must await the analysis of specimens from intermediate areas.

Gill & Mee (1993: 55) commented on the remarkable resemblance between the bright yellow form of *P. leucorhynchus* and the omobranchin blenniid *Oman ypsilon* Springer, and suggested that the two species might be involved in a mimetic relationship.

ETYMOLOGY: The specific epithet is derived from the Greek *leukos*, white, and *rhynchos*, snout, with reference to the distinctive live coloration.

MATERIAL EXAMINED: OMAN: Barr al Hikman, BPBM 34495, 4(4), 45.7-62.2 mm SL, CAS 66903, 1(1), 78.8 mm SL; W side of Masirah Id, CAS 66904, 1(1), 56.8 mm SL; Eagles' Retreat (near Mirbat), BPBM 34442, 2(2), 29.5-30.3 mm SL. KENYA: Patta Id, Congoni Channel, USNM 214105, 1(1), 38.6 mm SL (paratype), SMF 12989, 1(1), 37.9 mm SL (paratype); Manda Id, LACM 31617-6, 4(4), 30.2-38.0 mm SL (32.6 mm SL specimen subsequently cleared and stained); South Sail Rock Channel, LACM 31619-8, 1(1), 57.3 mm SL; Lamu Id, Shela, BMNH 1975.2.12:17, 1(1), 53.4 mm SL (holotype), BMNH 1975.2.12:8-9, 2(2), 46.9-51.5 mm SL (paratypes), BPBM 18038, 1(1), 49.9 mm SL (paratype).

Pseudochromis linda Randall & Stanaland
False Olive Dottyback
Figures 48-49; Plates 8G-H

Pseudochromis olivaceus [*non* Rüppell, 1835]; Pellegrin, 1904: 544 (Djibouti); Nielsen, 1961: 251 (Karachi); Lubbock, 1975: 131 (description and distribution in part, Gulf of Aden and Arabian Gulf records only); Relyea, 1981: 67.

Pseudochromis linda Randall & Stanaland, 1989: 107, figs 1-4 (type locality: Jana Id, Saudi Arabia, Persian Gulf); Gill & Mee, 1993: 56, fig. 5 (habitat and distribution; colour fig.); Gill & Randall, 1994: 16 (key); Randall, 1995: 142, fig. 335 (description; distribution; colour fig.); Carpenter et al., 1997: 147 (description; habitat notes; fig.); Debelius, 1998: 70 (colour fig.; habitat and distribution).

DIAGNOSIS: *Pseudochromis linda* is distinguished from congeners in having the following combination of characters: large dark brown to black (dark blue to black in life) spot present on opercular flap; predorsal scales 26-36; dorsal-fin origin to pelvic-fin origin 31.7-34.8 % SL; and dark spots on sides of body, if present, rounded to vertically elongate but not crescentic.

DESCRIPTION (based on 44 specimens, 17.3-68.7 mm SL): dorsal-fin rays III,26-29, last 8-26 segmented rays branched; anal-fin rays III,14-16, all or all but first 1-2 segmented rays branched; pectoral-fin rays 17-19; upper procurrent caudal-fin rays 5-8; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 28-32; scales in lateral series 38-46; anterior lateral-line scales 31-38; anterior lateral line terminating beneath segmented dorsal-fin ray 17-23; posterior lateral line-scales 0-18 + 0-2; scales between lateral lines 4-6; horizontal scale rows above anal-fin origin 16-21 + 1 + 3-6 = 21-27; circumpeduncular scales 19-22; predorsal scales 26-36; scales behind eye 3-5; scales to preopercular angle 6-8; gill rakers 4-7 + 11-14 = 15-20; pseudobranch filaments 8-16; circumorbital pores 14-49; preopercular pores 10-23; dentary pores 4; posterior interorbital pores 0-3.

Lower lip incomplete; dorsal and anal fins usually without well-developed scale sheaths, although these sometimes present posteriorly on fins of large specimens; predorsal scales extending anteriorly to point ranging from vicinity of PIO pores to posterior nasal pores; opercle with 3-5, usually relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers mainly well developed on distal halves or tips of rakers only, although well-developed teeth often run most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1 + 1/1/1/1 + 1*; dorsal-fin spines moderately slender and pungent; anterior anal-fin pterygiophore formula

3/1 + 1/1 + 1*/1*; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine moderately slender to stout and pungent; second or third segmented pelvic-fin ray longest; caudal fin rounded, sometimes weakly rounded to truncate posteriorly, rarely weakly emarginate; vertebrae 10 + 16; epineurals 14-16; epurals 3.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate or with 1 row of small conical teeth anteriorly; tongue moderately pointed and edentate.

As percentage of SL (based on 18 specimens, 39.6-65.4 mm SL): head length 22.9-27.3; orbit diameter 7.2-10.0; snout length 6.2-7.5; fleshy interorbital width 5.2-6.6; bony interorbital width 3.2-4.0; body width 11.7-13.5; snout tip to posterior tip of retroarticular bone 13.5-15.9; predorsal length 29.8-35.0; prepelvic length 31.7-36.0; posterior tip of retroarticular bone to pelvic-fin origin 18.5-22.3; dorsal-fin origin to pelvic-fin origin 31.6-34.8; dorsal-fin origin to middle dorsal-fin ray 34.8-39.4; dorsal-fin origin to anal-fin origin 44.0-47.1; pelvic-fin origin to anal-fin origin 23.7-30.8; middle dorsal-fin ray to dorsal-fin termination 22.7-31.8; middle dorsal-fin ray to anal-fin origin 29.1-34.2;anal-fin origin to dorsal-fin termination 37.5-41.9; anal-fin base length 29.3-33.8; dorsal-fin termination to anal-fin termination 15.4-18.1; dorsal-fin termination to caudal peduncle dorsal edge 8.0-11.8; dorsal-fin termination to caudal peduncle ventral edge 17.7-21.3; anal-fin termination to caudal peduncle dorsal edge 18.6-21.7; anal-fin termination to caudal peduncle ventral edge 9.5-12.1; first dorsal-fin spine 2.1-4.2; second dorsal-fin spine 4.8-7.3; third dorsal-fin spine 7.2-9.0; first segmented dorsal-fin ray 12.4-17.3; fourth last segmented dorsal-fin ray 18.6-26.0; first anal-fin spine 1.8-3.7; second anal-fin spine 4.6-8.4; third anal-fin spine 5.7-8.1; first segmented anal-fin ray 9.9-12.8; fourth last segmented anal-fin ray 17.3-26.3; third pectoral-fin ray 13.2-16.7; pelvic-fin spine 7.0-10.9; second segmented pelvic-fin ray 23.2-35.8; caudal-fin length 23.2-35.5.

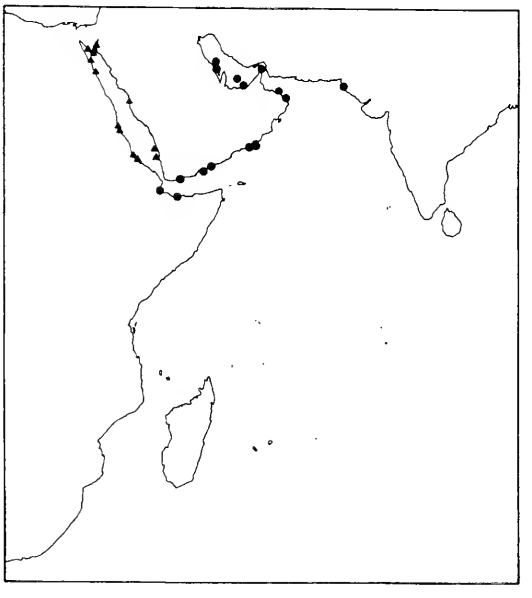

Figure 48. Distributional records for *Pseudochromis linda* (closed circles) and *P. olivaceus* (triangles).

Live coloration (based on photographs of specimens from the Persian Gulf and Oman, and underwater observations in Abu Dhabi, Persian Gulf; Plates 8G-H): head and body dark olive-brown to black, sometimes becoming pinkish to yellowish brown ventrally on head and abdomen and/or posteriorly on caudal peduncle; large dark blue to black spot on opercular flap, this sometimes edged with bright blue or bright red; dark blue curved line extending around posteroventral rim of orbit to upper lip, then ascending along anterior edge of first infraorbital, descending portion of line sometimes edged dorsally with reddish brown; iris reddish brown to dark grey with dark blue suboval ring around pupil; dorsal and anal fins either uniform dark grey to black or dark grey to black on basal third of fin with remainder dusky hyaline; dorsal and anal fins sometimes pale orange to bright red subdistally with dark grey distal margin, latter broadest on spinous portion of fins; dusky hyaline portion of fins sometimes with several horizontal to oblique rows of short dark grey streaks; caudal fin either uniform dark grey to black, or yellowish brown basally with remainder of fin bright yellow, becoming yellowish hyaline distally, with bluish grey distal margin; pectoral fins yellowish to brownish hyaline; pelvic fins greyish hyaline to dark grey or black.

Preserved coloration: pattern similar to live coloration, head and body becoming pale brown to dark grey-brown, sometimes either darker or paler posteriorly and paler on breast; dark blue to black spot on opercular flap remains, becoming dark brown to black; dark blue line around posteroventral orbital rim usually remains, although sometimes distinct on midposterior part only, becoming grey to black; sides of body often with several to many scattered round to vertically elongate dark brown to black spots; dorsal and anal fins brown to dark brown or black, often with distal part of fins pale grey to dusky hyaline submarginally or marginally; caudal fin either pale brown, becoming brownish hyaline distally, sometimes with upper and lower margins dusky, or brown to dark brown or black, usually with upper and lower and sometimes posterior edges pale grey to greyish hyaline submarginally; pectoral fins hyaline to dusky hyaline; pelvic fins dusky hyaline or pale brown to black, sometimes with anterior edges pale brown to pale grey.

HABITAT AND DISTRIBUTION: *Pseudochromis linda* has been observed (Lubbock, 1975: 132; Gill & Mee, 1993: 56; J.M. Kemp, pers. comm.) and collected from the Gulf of Aden, Arabian Peninsula, Persian Gulf and Pakistan (Figure 48). It has been collected from tidal pools and coral and rock reef areas at depths ranging to 15 m. It is often associated with *Acropora* and other branching corals.

COMPARISONS: This species has been previously confused

with *P. olivaceus*. Randall & Stanaland (1989) distinguished the two species primarily on the basis of differences in caudal fin shape and coloration. *Pseudochromis linda* differs from *P. olivaceus* in having a rounded to truncate or rarely weakly emarginate caudal fin (versus usually weakly to strongly emarginate, although often rounded or rounded with truncate posterior margin) and in either lacking dark markings on the sides of the body or, if present, having only rounded to vertically elongate spots (versus sides of body with a few to many crescent-shaped dark grey to black marks). Randall & Stanaland (1989) suggested that the two species also differ in a number of meristic details. However, all of their meristic characters either do not differ significantly between the two species (for either their data or the data presented here; see Appendix 1), or overlap so broadly that they are of little use in diagnosing the species. An additional character distinguishing the species was discovered in the present study. The scales on the anterior part of the body in both species are cycloid, whereas those on the posterior part of the body are ctenoid. *Pseudochromis linda* differs from *P. olivaceus* in that it tends to have a more extensive coverage of cycloid scales. Furthermore, cycloid scale coverage in *P. linda* tends to increase with growth (due to loss or resorption of scale cteni), making differences between the two species more apparent in large specimens (Figure 49).

The following combination of characters distinguishes *P. linda* from all other pseudochromines: large dark brown to black (dark blue to black in life) spot on the opercular flap; predorsal scales 26-36; and dorsal-fin origin to pelvic-fin origin 31.7-34.8 % SL.

REMARKS: *Pseudochromis linda* is a moderately large pseudochromine; the largest specimen examined measured 68.7 mm SL. Live colour illustrations of this species are provided in Randall & Stanaland (1989), Gill & Mee (1993), Randall (1995) and Debelius (1998).

ETYMOLOGY: The specific epithet is a noun in apposition for Linda J. McCarthy.

MATERIAL EXAMINED: PERSIAN (ARABIAN) GULF: Saudi Arabia, Jana Id, AMS I.26715-001, 4(4), 33.0-46.5 (paratypes; 44.5 mm SL specimen subsequently cleared and stained), BPBM 30487, 1(1), 42.3 mm SL (holotype); Das Id, BMNH 1973.12.20:29-42, 14(14), 17.3-63.0 mm SL (paratypes); Bahrain, reef at 26°08'20"N 50°43'20"E, BPBM 31024, 1(1), 68.7 mm SL. OMAN: Masqat, Al Bustan area, CAS 66902, 1(0), 60.5 mm SL; NE of Sur, ROM 40003, 2(2), 47.9-51.7 mm SL (paratypes), ROM 40008, 3(3), 40.5-49.9 mm SL (paratypes), ROM 40016, 1(1), 33.7 mm SL (paratype); Mirbat area, USNM 324635, 1(0), 28.8 mm SL. GULF OF ADEN: Djibouti, MNHN 1897-328, 1(1), 64.2 mm SL, MNHN 1897-329, 1(1), 48.0 mm SL, MNHN 1897-330, 1(1), 48.3 mm SL, MNHN 1897-332, 1(1), 58.9 mm SL, MNHN 1904-331, 1(1), 43.0 mm SL; Golfe de Tadjourah, Maskali Id, MNHN 1977-731, 1(1), 30.5 mm SL; Somalia, Berbera, BMNH 1973.12.20:44-55, 12(12), 21.5-65.4 mm SL (paratypes).

Pseudochromis litus Gill & Randall

Plain Dottyback

Figure 39; Plate 8I

Pseudochromis litus Gill & Randall, 1998: 22, figs 5,6 (type locality: Komodo Id, Indonesia); Gill, 1999b: 2565 (key).

DIAGNOSIS: The following characters in combination distinguish *P. litus* from congeners: dorsal-fin rays III,25, all segmented rays branched; anal-fin rays III,14-15; anal-fin spines stout and pungent, the second spine stouter to much stouter than the third; circumpeduncular scales 16; caudal fin

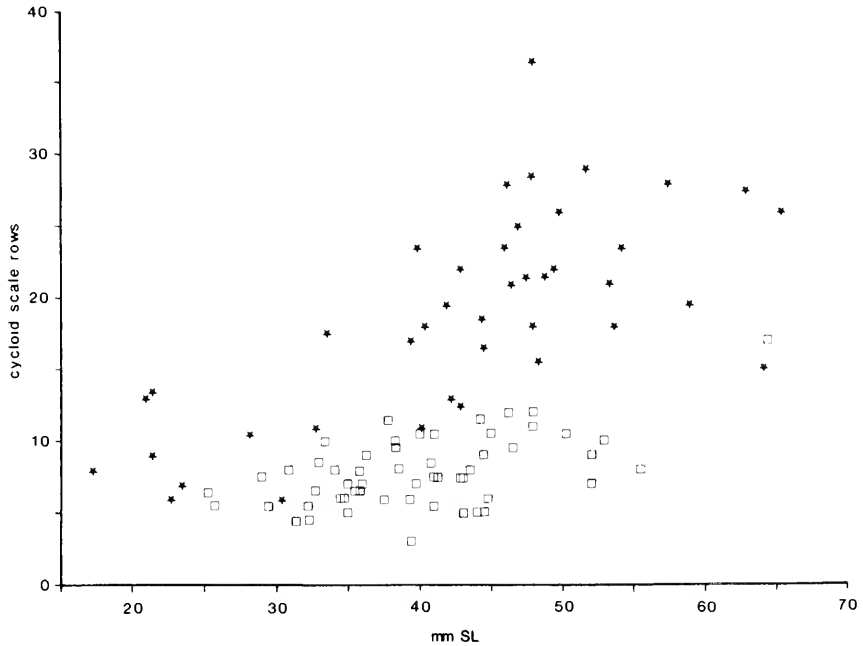

Figure 49. Plot of number of anterior cycloid body scale rows (counted along horizontal septum from first anterior lateral-line scale; averaged for left and right sides) against standard length for *Pseudochromis linda* (stars) and *P. olivaceus* (squares).

rounded; pseudobranch filaments 11-15; no dark spot on pectoral-fin axil; and head and body greyish brown (in life yellowish to greenish grey, becoming bluish grey posteriorly), becoming paler on ventral part of head and abdomen (pale pink to white in life), the scales on upper part of body each with an indistinct pale brown (pale yellow to pale yellowish grey in life) spot, these usually only apparent on anterior-lateral-line scales.

DESCRIPTION (based on six specimens, 36.8-55.9 mm SL): dorsal-fin rays III,25, all segmented rays branched; anal-fin rays III,14-15, all segmented rays branched; pectoral-fin rays 17-18; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 29-31; scales in lateral series 34-39; anterior lateral-line scales 25-32; anterior lateral line terminating beneath segmented dorsal-fin ray 17-22; posterior lateral-line scales 7-10 + 0-2; scales between lateral lines 3; horizontal scale rows above anal-fin origin 12-14 + 1 + 2-5 = 16-19; circumpeduncular scales 16; predorsal scales 21-23; scales behind eye 2-4; scales to preopercular angle 4-5; gill rakers 5-7 + 11-13 = 16-19; pseudobranch filaments 11-15; circumorbital pores 19-42; preopercular pores 8-22; dentary pores 4; posterior interorbital pores 1-3.

Lower lip incomplete, with weak to moderate symphyseal interruption; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from posterior nasal pores to posterior nostrils; opercle with 4-7 relatively inconspicuous serrations; teeth of outer ceratobranchial-1 gill rakers well developed on raker tips only; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/I + 1*/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1*/1; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine moderately stout to stout and pungent; second segmented pelvic-fin ray longest; caudal fin rounded to weakly rounded (almost truncate); vertebrae 10 + 16; epineurals 13-14; epurals 3.

Upper jaw with 2 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw slightly larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatines with 1-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL: head length 24.2-25.8; orbit diameter 9.1-10.3; snout length 5.1-6.5; fleshy interorbital width 5.7-6.3; bony interorbital width 3.4-4.3; body width 11.8-13.0; snout tip to posterior tip of retroarticular bone 13.7-14.7; predorsal length 31.2-34.4; prepelvic length 31.0-32.5; posterior tip of retroarticular bone to pelvic-fin origin 18.0-22.6; dorsal-fin origin to pelvic-fin origin 28.5-31.5; dorsal-fin origin to middle dorsal-fin ray 32.4-35.2; dorsal-fin origin to anal-fin origin 41.3-43.1; pelvic-fin origin to anal-fin origin 26.6-32.6; middle dorsal-fin ray to dorsal-fin termination 24.1-27.7; middle dorsal-fin ray to anal-fin origin 26.6-28.8; anal-fin origin to dorsal-fin termination 33.4-36.8; anal-fin base length 25.6-29.6; dorsal-fin termination to anal-fin termination 15.2-17.1; dorsal-fin termination to caudal peduncle dorsal edge 11.4-12.2; dorsal-fin termination to caudal peduncle ventral edge 18.8-20.3; anal-fin termination to caudal peduncle dorsal edge 19.4-21.6; anal-fin termination to caudal peduncle ventral edge 11.3-13.4; first dorsal-fin spine 1.7-2.5; second dorsal-fin spine 4.5-6.6; third dorsal-fin spine 6.7-9.1; first segmented dorsal-fin ray 11.2-14.0; fourth last segmented dorsal-fin ray 16.6-17.6; first anal-fin spine 2.1-2.9; second anal-fin spine 5.7-6.8; third anal-fin spine 6.1-9.3; first segmented anal-fin ray 10.8-14.4; fourth last segmented anal-fin ray 14.7-17.2; third pectoral-fin ray 14.2-16.0; pelvic-fin spine 10.6-12.5; second segmented pelvic-fin ray 21.9-30.9; caudal-fin length 24.1-27.9.

Live coloration (based on photographs of type specimens when alive and/or freshly dead; Plate 81): head and body yellowish to greenish grey, becoming pale pink to white ventrally and bluish grey to dark bluish grey posteriorly on caudal peduncle; anterior part of operculum with several fine, mainly horizontal, pale pink to white vermiculate lines on a reddish brown background; diffuse bluish grey stripe extending from anterior edge of eye to snout tip; posteroventral part of orbital rim yellowish grey to bright yellow, this edged posteriorly by diffuse pale blue to pale grey arc; iris yellowish grey to reddish brown, orangish to white around perimeter of pupil, with dark greyish blue suboval ring around pupil; scales on upper part of body each with an indistinct pale yellow to pale yellowish grey spot, these sometimes edged posterior with dusky grey, and usually obvious only on anterior-lateral-line scales; dorsal fin pale blue to pale grey on basal third of fin, remainder of fin hyaline, with fin rays bright yellow to pale grey; basal edge of fin sometimes with narrow yellow stripe; anal fin pale grey to pale blue basally, remainder of fin hyaline to greyish hyaline; caudal fin base dark bluish grey, becoming greyish hyaline to grey posteriorly on middle rays, upper and lower borders of fin abruptly pale yellowish grey to pale blue or hyaline; pectoral fin yellowish to pinkish hyaline; pelvic fins pale grey to pale blue.

Preserved coloration: pattern similar to live coloration, head and body greyish brown, paler on ventral part of head and abdomen; pale lines on operculum becoming obsolete; yellowish grey to bright yellow marking on orbital rim becoming pale brown; pale yellow to yellowish grey spots on body scales becoming pale brown, usually only apparent on anterior lateral-line scales; dorsal and anal fins greyish brown basally, hyaline distally, greyish brown markings sometimes edged distally by pale grey to pale brown stripe; caudal fin greyish brown basally, upper and lower borders broadly pale brown to hyaline; pectoral and pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis litus* is known only from the Banda and Flores Seas, southeastern Indonesia (Figure 39). However, as noted by Gill & Randall (1998: 24), it possibly also ranges north to Ambon, Indonesia, and Cebu Strait, Philippines (see *Remarks* below). It has been collected from coral heads, rocks and caves on reef slopes and dropoffs in 9 to 35 m.

COMPARISONS: *Pseudochromis litus* resembles *P. alticaudex, P. aurulentus, P. flavopunctatus* and *P. marshallensis* in most meristic details and in having pale spots on body scales. However, it differs from *P. alticaudex* in having fewer circumpeduncular scales (16 versus 16-20, usually 20), more segmented anal-fin rays (14-15 versus 12-13), more segmented dorsal-fin rays (25 versus 24-25, rarely 25), more anterior lateral-line scales (25-32 versus 18-25), and in caudal-fin shape (rounded to weakly rounded versus weakly rounded to truncate or emarginate), from *P. aurulentus* in having fewer segmented dorsal-fin rays (25 versus 27), and in lacking a dark spot on the pectoral-fin axil, from *P. flavopunctatus* in having fewer segmented dorsal-fin rays (25 versus 25-27, usually 26), fewer segmented anal-fin rays (14-15 versus 16), more horizontal scale rows above anal-fin origin (12-14 + 1 + 2-5 = 16-19 versus 10-12 + 1 + 2-3 = 13-16), and in lacking a dark spot on the pectoral-fin axil, and from *P. marshallensis* in having more segmented anal-fin rays (14-15 versus 11-14, usually 13) and caudal-fin shape (rounded to weakly rounded versus rounded to emarginate, usually truncate to emarginate in adult specimens).

REMARKS: *Pseudochromis litus* is a moderate-sized species; the largest specimen examined measured 55.9 mm SL. Live colour photographs of it are provided by Gill & Randall (1998).

Gill & Randall (1998) noted that two specimens from Ambon, Indonesia (BPBM 18509) and three specimens from Cebu Strait, Philippines (BMNH 1983.3.25.186-188) might be referable to *P. litus*, but that they differ from the *P. litus* type specimens in minor coloration, morphometric and meristic details. Further samples are needed to clarify the identity of the Ambon and Cebu Strait specimens.

ETYMOLOGY: The specific epithet is from the Greek, *litos*, meaning plain or simple, and alludes to the relatively unadorned colour pattern.

MATERIAL EXAMINED: INDONESIA: Lucipara Ids, Pulau Pulau Penyu, Mai Id, BPBM 32345, 1(1), 41.0 mm SL (paratype); Komodo Id, CAS 62176, 1(1), 55.9 mm SL (paratype); Komodo Id, just E of Turo Liu Point, BPBM 35015, 1(1), 51.1 mm SL (holotype); Flores, SE side of Pulau Besar, BPBM 34078, 1(1), 39.5 mm SL (paratype); W side of Wetar Id, BPBM 37379, 1(1), 36.8 mm SL (paratype); Banda Sea, Batang, BPBM 34562, 1(1), 54.1 mm SL (paratype).

***Pseudochromis luteus* Aoyagi**
Orange Dottyback
Figure 45; Plates 8J, 9A

?*Pseudochromis quinquedentatus* [*non* McCulloch, 1926]; Aoyagi, 1941c: 43, fig. 1 (description; Ishigaki, Riu kiu Ids).

?*Pseudochromis xanthochir* [*non* Bleeker, 1855a]; Aoyagi, 1941c: 44, pl. 4, fig. 1 (description; colour fig.; Ishuigaki Id, Riu Kiu Ids); Aoyagi, 1943: 105, pl. 31, fig. 1 (Riu Kiu Ids).

Pseudochromis luteus Aoyagi, 1943: 103, pl. 32, fig. 1 (type locality: Kikai Id, Riu Kiu Ids); Kamohara & Yamakawa, 1965: 10 (Matsubara, Tekuzuku and Somachi, Ryukyu Ids); Shen, 1984: fig. 291-2 (southern Taiwan); Burgess et al., 1988: pl. 150 (colour fig.); Gill, 1993: 46 (sexual dimorphism; distribution); Gill & Winterbottom, 1993: 4 (distribution; comparison); Gill, 1999b: 2565 (key).

Pseudochromis kikaii [*non* Aoyagi, 1941c]; Aoyagi, 1943: 104 (in part, Riu-Kiu Ids); Shen, 1984: fig. 291-3 (southern Taiwan).

Pseudochromis aureus [*non* Seale, 1910]; Burgess and Axelrod, 1974: fig. 263 (Taiwan).

Pseudochromis porphyreus [*non* Lubbock and Goldman, 1974]; Shen, 1984: fig. 291-1a and 1b (Lan-yü, Taiwan).

Pseudochromis ruber; Debelius, 1984b: 426 (*nomen nudum*; colour fig.); Debelius, 1986: 20 (*nomen nudum*; colour fig.).

DIAGNOSIS: *Pseudochromis luteus* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 24-26 (usually 25), with all or all but first rays branched; segmented anal-fin rays 13-14 (usually 14); pectoral-fin rays 16-19 (usually 17-18); anterior lateral-line scales 26-32 (usually 28-32), terminating beneath segmented dorsal-fin ray 17-24 (usually 20-23); circumpeduncular scales 16; anal-fin spines slender and weakly pungent to flexible with the second spine about as stout as the third; and dorsoposterior part of caudal peduncle without grey to black spot.

DESCRIPTION (based on 26 specimens, 33.5-46.5 mm SL): dorsal-fin rays III,24-26, all or all but first segmented rays branched; anal-fin rays III,13-14, all or all but first segmented rays branched; pectoral-fin rays 16-19; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 5-7; total caudal-fin rays 28-31; scales in lateral series 33-39; anterior lateral-line scales 26-32; anterior lateral line terminating beneath segmented dorsal-fin ray 17-24; posterior lateral-line scales 5-13 + 0-2; scales between lateral lines 2-4; horizontal scale rows above anal-fin origin 11-14 + 1 + 2-3 = 14-18; circumpeduncular scales 16; predorsal scales 12-17; scales behind eye 2-3; scales to preopercular angle 3-5; gill rakers 4-6 + 10-12 = 14-18; pseudobranch filaments 7-10; circumorbital pores 23-49; preopercular pores 12-22; dentary pores 4-5; posterior interorbital pores 1-2.

Lower lip varying from incomplete with weak symphyseal interruption to complete; dorsal and anal fins without distinct scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of posterior AIO pores to posterior nasal pores; opercle with 3-7 indistinct serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or with well-developed teeth confined to raker tips, although sometimes with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1 + 1*/1 or S/S/S + 3/1 + 1/1/1/1 + 1/1/1; dorsal-fin spines slender and weakly pungent to flexible; anterior anal-fin pterygiophore formula 3/1/1 + 1/1/1 + 1 or 3/1 + 1 + 1*/1*/1 + 1*; anal-fin spines slender and weakly pungent to flexible, second spine about as stout as third; pelvic-fin spine slender and weakly pungent to flexible; second segmented pelvic-fin ray usually longest, although third ray sometimes subequal to or slightly longer than second; caudal fin rounded; vertebrae 10 + 16; epineurals 13-14; epurals 3.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth, and 5-7 (at symphysis) to 1-3 (on sides of jaw) inner

rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, conical teeth becoming slightly larger and more curved on middle of jaw; vomer with 2-3 rows of small conical teeth, forming chevron; palatine with 2-3 irregular rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 21 specimens, 33.5-46.5 mm SL): head length 23.4-27.2; orbit diameter 8.7-10.7; snout length 4.8-6.1; fleshy interorbital width 4.2-5.0; bony interorbital width 2.6-3.2; body width 11.3-13.7; snout tip to posterior tip of retroarticular bone 12.1-14.0; predorsal length 30.0-35.8; prepelvic length 29.4-33.1; posterior tip of retroarticular bone to pelvic-fin origin 17.6-20.9; dorsal-fin origin to pelvic-fin origin 25.9-30.6; dorsal-fin origin to middle dorsal-fin ray 29.3-35.4; dorsal-fin origin to anal-fin origin 38.7-43.6; pelvic-fin origin to anal-fin origin 28.5-34.7; middle dorsal-fin ray to dorsal-fin termination 22.4-27.6; middle dorsal-fin ray to anal-fin origin 24.2-29.7; anal-fin origin to dorsal-fin termination 32.1-35.4; anal-fin base length 21.7-26.4; dorsal-fin termination to anal-fin termination 15.2-17.2; dorsal-fin termination to caudal peduncle dorsal edge 12.2-14.3; dorsal-fin termination to caudal peduncle ventral edge 18.5-20.6; anal-fin termination to caudal peduncle dorsal edge 20.9-23.2; anal-fin termination to caudal peduncle ventral edge 13.9-17.3; first dorsal-fin spine 1.5-3.1; second dorsal-fin spine 3.1-5.2; third dorsal-fin spine 5.0-8.3; first segmented dorsal-fin ray 9.2-12.2; fourth last segmented dorsal-fin ray 14.0-16.5; first anal-fin spine 0.6-2.2; second anal-fin spine 2.5-5.1; third anal-fin spine 4.8-7.5; first segmented anal-fin ray 9.2-12.1; fourth last segmented anal-fin ray 13.6-15.9; third pectoral-fin ray 15.2-18.3; pelvic-fin spine 8.2-11.2; second segmented pelvic-fin ray 17.4-21.8; caudal-fin length 22.1-24.2.

Live coloration: Females (based on a photograph of a specimen from Mao-pi Tou, southern Taiwan; Plate 8J): head and body brown, becoming pale grey ventrally on head; iris pale yellow with blue suboval ring around pupil; caudal peduncle pinkish purple; dorsal and anal fins pale pinkish grey on basal third of fins, remainder pinkish hyaline with blue distal margin; caudal fin pinkish purple basally, becoming pale pinkish grey to pinkish hyaline posteriorly, with blue distal margin; pectoral fins hyaline; pelvic fins pinkish hyaline. Males (based on photographs of specimens from southern Taiwan and the Batan Ids, Philippines; Plate 9A): head and body bright orange-red to crimson, becoming pale orange to orange-red ventrally on head and breast; iris bright red with blue suboval ring around pupil; dorsal and anal fins bright red, paler on basal third, with blue distal margin; caudal fin bright orange-yellow to bright red basally, becoming bright yellow to bright orange or bright red posteriorly, with reddish to yellowish hyaline distal margin; pelvic and pectoral fins pinkish to yellowish or reddish hyaline.

Preserved coloration: Females: head and body brown to dark brown, paler ventrally; dorsal, anal and caudal fins brown to dark brown or dark grey basally, remainder of fins brownish hyaline to hyaline, usually with brown to dark grey distal margin; pectoral fins hyaline; pelvic fins pale yellow to hyaline. Males: head and body pale yellow to pale orangish brown, becoming pale greyish brown dorsally; dorsal and anal fins pale yellow to yellowish hyaline with grey to greyish brown distal margin; caudal fin pale orange-brown to yellowish brown basally, remainder of fin pale yellow to yellowish hyaline with grey to greyish brown distal margin; pectoral fins yellowish hyaline to hyaline; pelvic fins pale yellow to yellowish hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis luteus* is known only from the Ryukyu Ids, southern Taiwan and the Batan Ids, northern Philippines (Figure 45). Based on a live colour description of a *Pseudochromis* specimen mentioned in R. Lubbock's unpublished field notes, this species probably ranges south to the Pollillo Ids off the east coast of Luzon, Philippines; Debelius's (1984b, 1986) colour figures of *P. ruber* (a *nomen nudum*) are possibly of Lubbock's specimen. *Pseudochromis luteus* has been collected intertidally and around rock and coral reefs at depths ranging to 20 m.

COMPARISONS: This species is very similar in morphology to *Pseudochromis jamesi* and *P. kolythrus* from the southwest Pacific. Characters distinguishing the three species are discussed under *Comparisons* for *P. jamesi*. The following combination of characters distinguishes *P. luteus* from all other pseudochromines: segmented dorsal-fin rays 24-26 (usually 25), with all or all but first segmented rays branched; segmented anal-fin rays 13-14; circumpeduncular scales 16; and anal fin spines slender and weakly pungent to flexible, with the second spine about as stout as the third.

REMARKS: *Pseudochromis luteus* is a relatively small species; the largest specimen examined measured 46.5 mm SL. This species shows similar sexual dimorphism to *P. jamesi*. The male colour form has been illustrated by Burgess & Axelrod (1974), Shen (1984 - as *P. luteus, P. kikaii* and *P. porphyreus*), Burgess et al. (1988) and Debelius (1984b, 1986 - as *P. ruber*). The female form has apparently not been illustrated previously, although Aoyagi's (1943) description and colour illustration of *P. xanthochir* is possibly based on a female of this species.

Aoyagi's (1943) holotype of *P. luteus* is missing; M. Hayashi (pers. comm.) was unable to locate the specimen in the collection of the Yokosuka City Museum, which now houses Aoyagi's material. There is little doubt that Aoyagi's description and figure refer to the present species. Never-theless, his description differs from that given here in several minor features; most notably, he recorded a dorsal-fin ray count of II,23 (versus III, 24-26, usually III,25), two (versus three) anal-fin spines, and a gill-raker count of 4 + 8 (versus 4-6 + 10-12 = 14-18). However, Aoyagi apparently overlooked the first dorsal- and anal-fin spines of several species of the *P. tapeinosoma* complex (see Gill & Winterbottom, 1993), and his segmented dorsal-fin ray count is only one fewer than the lowest count recorded here. Aoyagi's lower gill-raker count is lower than recorded here for any pseudochromine species; it seems likely that the lower gill rakers of the holotype were either damaged or abnormal.

Based on the ranges for the segmented dorsal- and anal-fin ray counts (22-25 and 13-14, respectively), Aoyagi's (1941c)

description of *P. kikaii* appears to be composite and based on females of *P. cyanotaenia* and *P. luteus*. The holotype of *P. kikaii* was examined and is referable to *P. cyanotaenia*.

Aoyagi's (1941c) specimen of *P. quinquedentatus* from Ishigaki Id, Ryukyu Ids, could not be located. However, his description and figure appear to be based on the present species.

ETYMOLOGY: The specific epithet is from the Latin for yellow with reference to the live coloration of the holotype.

MATERIAL EXAMINED: JAPAN: Ryukyu Ids, Ishigaki, BPBM 8738, 3(3), 37.5-41.3 mm SL. TAIWAN: Lan-yu, NTUM 3752, 1(1), 35.7 mm SL; Nan-wan, NTUM 3756, 1(1), 35.8 mm SL: S end of Mao-pi T'ou, BPBM 23381, 1(0), 36.0 mm SL, USNM 290862, 1(0); near Ta-pan Lieh, USNM 290689, 1(0); bay SE of K'en-ting, USNM 290863, 2(0), USNM 290960, 1(0); Ch'uan-fan-shih, BPBM 23354, 5(5), 36.5-46.1 mm SL, USNM 290097, 7(6, 38.9-41.7 mm SL), 37.6-41.7 mm SL, USNM 290080, 3(0), USNM 290114, 3(0), USNM 290338, 2(0), USNM 290420, 2(0), USNM 290941, 2(0), USNM 290946, 4(0), USNM 290949, 8(0); S of Chin-ch'iao Wan, USNM 290681, 1(1), 41.6 mm SL; rocky headland near Sha-toa, USNM 290085, 2(0), USNM 290187, 2(0). PHILIPPINES: Batan Ids, Y'ami Id, USNM 291605, 3(0); Batan Ids, southern side of Siayan Id, USNM 292079, 5(2, 39.0-39.8 mm SL), 11.8-39.8 mm SL; Batan Ids, Batan Id, White Beach, USNM 291628, 7(7), 33.5-46.5 mm SL, USNM 291613, 2(0); Batan Ids, Ibahos Id, USNM 291604, 2(0).

***Pseudochromis madagascariensis* sp. nov.**
Madagascan Dottyback
Figures 47, 50

Pseudochromis natalensis [*non* Regan, 1916]; Lubbock, 1977: 10 (description and distribution in part).

HOLOTYPE: MNHN 1966-66, 49.0 mm SL, Madagascar, Diego Saurez, M. Pras.

PARATYPES: MNHN 2000-1690, 4: 39.6-52.0 mm SL, collected with holotype.

DIAGNOSIS: *Pseudochromis madagascariensis* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 26-27; segmented anal-fin rays 16-17; total caudal-fin rays 32-34; scales in lateral series 41-45; anterior lateral-line scales 32-36; circumpeduncular scales 20-21; and opercle with prominent dark spot anteriorly, without dark spot on opercular flap.

DESCRIPTION (based on five specimens, 39.6-52.0 mm SL; minimum and maximum value ranges given first for all type specimens, followed, where different, by values for holotype enclosed in parentheses): Dorsal-fin rays III,26-27 (III,26), all or all but first (all but first) segmented rays branched; anal-fin rays III,16-17 (III,16), all or all but first (all) segmented rays branched; pectoral-fin rays 18; upper procurrent caudal-fin rays 8-9 (9); lower procurrent caudal-fin rays 7-8 (8); total caudal-fin rays 32-34 (34); scales in lateral series 41-45 (44/44); anterior lateral-line scales 32-36 (35/34); anterior lateral line terminating beneath segmented dorsal-fin ray 17-20 (20/19); posterior lateral-line scales 0-10 + 0-3 (6 + 1/6 + 1); scales between lateral lines 3-4 (3/3); horizontal scale rows above anal-fin origin 13-15 + 1 + 3-4 = 17-19 (15 + 1 + 3/13 + 1 + 3); circumpeduncular scales 20-21 (20); predorsal scales 21-24 (22); scales behind eye 3; scales to preopercular angle 4-6 (4); gill rakers 5-6 + 11-12 = 16-17 (5 + 12); pseudobranch filaments 10-12 (11); circumorbital pores 23-31 (31/30); preopercular pores 10-20 (20/19); dentary pores 4; posterior interorbital pores 2.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from mid AIO to anterior AIO pores; opercle with 3-4 relatively distinct serrations; denticles of outer ceratobranchial-1 gill rakers well developed on raker tips only; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1/1 + 1*/1/1 (S/S/S + 3/1 + 1/1/1/1/1/1/1 + 1/1); dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray longest; caudal fin emarginate to strongly emarginate; vertebrae 10 + 16; epineurals 14-16 (16); epurals 3.

Upper jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly,

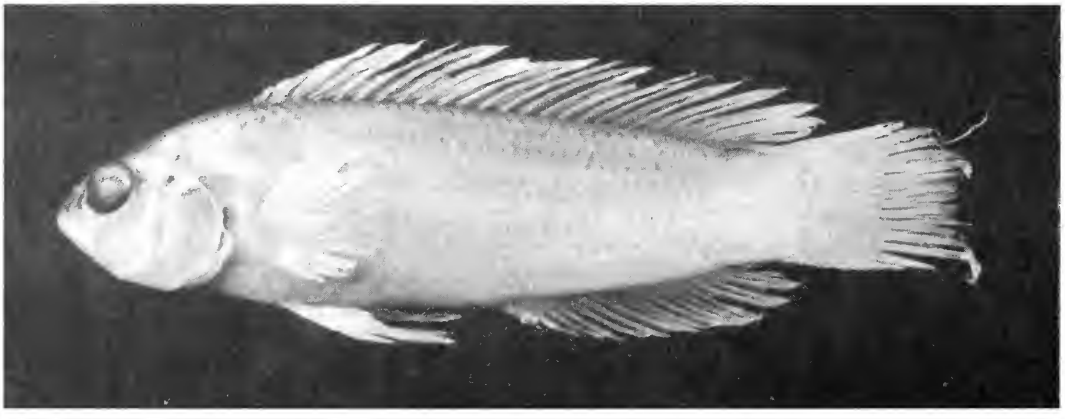

Figure 50. *Pseudochromis madagascariensis*, MNHN 1966-66, 49.0 mm SL, holotype, Diego Suarez, Madagascar. (Photo by P. Crabb)

and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on four specimens, 39.6-52.0 mm SL): head length 24.5-26.5 (24.5); orbit diameter 8.5-9.8 (8.6); snout length 6.3-6.8 (6.7); fleshy interorbital width 4.5-4.8 (4.5); bony interorbital width 2.8-3.1 (2.9); body width 11.0-12.9 (11.0); snout tip to posterior tip of retroarticular bone 13.3-13.9 (13.3); predorsal length 32.0-34.3 (32.0); prepelvic length 31.1-32.9 (32.7); posterior tip of retroarticular bone to pelvic-fin origin 17.7-20.8 (20.8); dorsal-fin origin to pelvic-fin origin 25.9-31.3 (25.9); dorsal-fin origin to middle dorsal-fin ray 35.9-40.4 (35.9); dorsal-fin origin to anal-fin origin 40.5-43.8 (40.5); pelvic-fin origin to anal-fin origin 25.8-27.8 (27.8); middle dorsal-fin ray to dorsal-fin termination 25.4-26.5 (26.5); middle dorsal-fin ray to anal-fin origin 25.5-28.0 (25.5); anal-fin origin to dorsal-fin termination 35.8-36.6 (36.1); anal-fin base length 28.4-30.6 (29.8); dorsal-fin termination to anal-fin termination 15.1-16.1 (15.1); dorsal-fin termination to caudal peduncle dorsal edge 8.1-10.8 (10.6); dorsal-fin termination to caudal peduncle ventral edge 18.2- 19.4 (19.4); anal-fin termination to caudal peduncle dorsal edge 19.2-20.0 (19.6); anal-fin termination to caudal peduncle ventral edge 9.1-11.6 (11.6); first dorsal-fin spine 2.2-2.3 (2.2); second dorsal-fin spine 3.5-6.1 (3.5); third dorsal-fin spine 8.8-10.1 (9.6); first segmented dorsal-fin ray 12.1-13.9 (13.9); fourth last segmented dorsal-fin ray 16.2-18.4 (18.4); first anal-fin spine 1.9-2.5 (2.0); second anal-fin spine 6.5-7.6 (7.6); third anal-fin spine 6.3-6.9 (6.9); first segmented anal-fin ray 9.3-10.0 (9.6); fourth last segmented anal-fin ray 12.1-15.2 (14.9); third pectoral-fin ray 13.1-15.0 (14.5); pelvic-fin spine 9.2-10.1 (9.2); second segmented pelvic-fin ray 20.2-23.1 (23.1); caudal-fin length 22.5-25.2 (25.1).

Live coloration: not known.

Preserved coloration: head and body brown to dark brown, becoming paler ventrally; anterodorsal corner of opercle just behind upper margin of preopercle with dark grey-brown spot; short dark grey-brown bar at midposterior rim of orbit, this sometimes continuing ventrally as indistinct curved streak along ventral edge of infraorbital bones to corner of mouth; short dark grey-brown stripe extending from anteroventral rim of orbit to mid-upper part of upper lip; scales of body and caudal peduncle each with small basal dark brown spot; dorsal and anal fins dark brown basally, becoming brownish hyaline distally; caudal fin brown basally, becoming brownish hyaline posteriorly, with upper and lower edges of fin slight paler; pectoral fins brownish hyaline; pelvic fins pale brown to brownish hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis madagascarensis* is known only from the type specimens, which are from a single collection in Diego Suarez, northeastern Madagascar (Figure 47). No details on habitat or depth are provided on the collection label for the specimens.

COMPARISONS: *Pseudochromis madagascariensis* is very similar in morphology to *P. kristinae*; characters distinguishing the two species are discussed under *Comparisons* for *P. kristinae*.

REMARKS: Lubbock (1977) misidentified the type specimens of *P. madagascariensis* (at that time all catalogued under MNHN 1966-66) as *P. natalensis*. His concept of the latter species also included *P. kristinae*.

A paratype of *P. kristinae* was collected with the types of *P. madagascariensis*.

ETYMOLOGY: The specific epithet refers to the type locality.

MATERIAL EXAMINED: See above type material.

***Pseudochromis magnificus* Lubbock**
Magnificent Dottyback
Figure 40; Plates 9B-C

Pseudochromis magnificus Lubbock, 1977: 3, pls 1a, 1b, 5a and 5b (type locality: Raphael Id, Cargados Carajos Shoals).

DIAGNOSIS: *Pseudochromis magnificus* is distinguished from congeners in having the following combination of characters: dorsal and anal fins with well-developed scale sheaths; segmented dorsal-fin rays 23-24 (usually 24); and anal-fin spines slender and weakly pungent to flexible, with the second spine about as stout as the third.

DESCRIPTION (based on 26 specimens, 36.7-51.5 mm SL): dorsal-fin rays III,23-24, all or all but first segmented rays branched; anal-fin rays III,13-15, all segmented rays branched; pectoral-fin rays 16-20; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 29-31; scales in lateral series 40-44; anterior lateral-line scales 30-36; anterior lateral line terminating beneath segmented dorsal-fin ray 16-21; posterior lateral-line scales 2-11 + 0-1; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 12-15 + 1 + 2-4 = 16-19; circumpeduncular scales 19-20; predorsal scales 12-18; scales behind eye 2-4; scales to preopercular angle 4-5; gill rakers 4-7 + 12-13 = 16-20; pseudobranch filaments 7-11; circumorbital pores 25-75; preopercular pores 13-37; dentary pores 4-7; posterior interorbital pores 1-2.

Lower lip varying from incomplete with weak symphyseal interruption to complete; dorsal and anal fins with well-developed scale sheaths; predorsal scales extending anteriorly to point ranging from vicinity of posterior AIO pores to anterior AIO pores; opercle with 4-6 small, usually indistinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed on raker tips only; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1/1 + 1*/1/1; dorsal-fin spines slender, tips weakly pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1*/1; anal-fin spines slender and weakly pungent to flexible, second spine about as stout as third; pelvic-fin spine slender, tip weakly pungent to flexible; second or third segmented pelvic-fin ray longest; caudal fin rounded, sometimes with weakly rounded to truncate posterior margin; vertebrae 10 + 16; epineurals 14-16; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform

teeth anteriorly, and 6-7 (at symphysis) to 2-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 2-3 rows of small conical teeth, forming chevron; palatine with 2-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 17 specimens, 36.7-51.5 mm SL): head length 23.7-27.4; orbit diameter 7.6-9.0; snout length 5.1-6.3; fleshy interorbital width 4.6-5.4; bony interorbital width 2.7-3.4; body width 12.2-13.6; snout tip to posterior tip of retroarticular bone 13.2-15.0; predorsal length 33.5-36.1; prepelvic length 30.6-33.0; posterior tip of retroarticular bone to pelvic-fin origin 18.0-20.2; dorsal-fin origin to pelvic-fin origin 27.6-30.3; dorsal-fin origin to middle dorsal-fin ray 32.5-36.0; dorsal-fin origin to anal-fin origin 40.9-43.7; pelvic-fin origin to anal-fin origin 27.4-33.3; middle dorsal-fin ray to dorsal-fin termination 23.3-26.4; middle dorsal-fin ray to anal-fin origin 27.1-30.4; anal-fin origin to dorsal-fin termination 34.2-37.4; anal-fin base length 24.0-28.2; dorsal-fin termination to anal-fin termination 16.4-17.8; dorsal-fin termination to caudal peduncle dorsal edge 10.1-11.7; dorsal-fin termination to caudal peduncle ventral edge 18.2-20.3; anal-fin termination to caudal peduncle dorsal edge 19.5-21.9; anal-fin termination to caudal peduncle ventral edge 10.9-14.2; first dorsal-fin spine 1.1-2.2; second dorsal-fin spine 2.9-4.7; third dorsal-fin spine 4.7-6.6; first segmented dorsal-fin ray 9.8-12.2; fourth last segmented dorsal-fin ray 14.8-19.1; first anal-fin spine 1.2-2.9; second anal-fin spine 2.9-4.6; third anal-fin spine 5.0-7.0; first segmented anal-fin ray 9.7-11.6; fourth last segmented anal-fin ray 14.0-17.5; third pectoral-fin ray 15.1-18.5; pelvic-fin spine 7.6-10.8; second segmented pelvic-fin ray 17.6-20.8; caudal-fin length 22.1-26.3.

Live coloration: Females (based on Lubbock, 1977: pl. 5b and a photograph of a specimen from Saint Brandon's Shoals; Plate 9B): head brown, becoming pale pink ventrally; posterior edge of infraorbitals with dark brown curved stripe; iris bright red with dark blue oval ring around pupil; body dark grey-brown, becoming pale pink ventrally on abdomen and breast; dorsal and anal fins dark grey-brown, each with narrow red submarginal and narrow blue distal stripe; caudal fin bright yellow, dark grey-brown basally, with dark grey-brown submarginal stripe and hyaline distal stripe; pectoral and pelvic fins pinkish hyaline. Males (based on Lubbock, 1977: pl. 5a and a colour photo of a specimen from Saint Brandon's Shoals; Plate 9C): dorsal part of head dark olive, becoming yellowish brown to bright yellow ventrally and bright orange anteriorly on snout and lips; posterior edge of infraorbitals with olive to dark olive curved line; iris bright orange with dark blue oval ring around pupil; body dark reddish purple, becoming black on caudal peduncle; breast and pectoral-fin base yellowish brown to bright olive-yellow; abdominal region bright olive-yellow to bright red, grading dorsally and posteriorly to reddish purple or reddish grey; scales of reddish purple area above abdominal region each with dark spot; dorsal fin bright orange-red with blue distal margin; narrow dark reddish brown basal stripe on anterior part of dorsal fin, stripe becoming black posteriorly and expanding to two-thirds of fin height; anal fin bright yellow to bright orange, becoming dark reddish brown basally, with blue distal margin and about three or four horizontal rows of blue spots; caudal fin black, bright yellow to bright orange submarginally, with dark blue distal margin; pectoral and pelvic fins pinkish hyaline.

Preserved coloration: Females: head and body brown, becoming paler ventrally on head and breast and posteriorly on caudal peduncle; dorsal and anal fins pale brown to dusky grey-brown; caudal fin pale brown to off-white, darker basally, usually with dusky grey-brown submarginal stripe distally; pectoral fins pale brown to hyaline; pelvic fins pale brown. Males: head and body brown, paler ventrally; scales of flanks behind pectoral fin each with darker brown basal spot; dorsal fin pale brown to greyish white, with two or three rows of greyish brown spots on distal part of fin and greyish brown distal margin; posterior half of dorsal fin greyish brown to dark grey basally, basal dark area expanding posteriorly to about two-thirds of fin height; anal fin pale greyish brown, with three to five rows of greyish brown to grey spots and greyish brown to grey distal margin; caudal fin brown, becoming dark grey-brown to black posteriorly, with broad pale brown to white submarginal stripe and greyish brown to grey distal margin; pectoral fins pale brown to hyaline; pelvic fins pale brown.

HABITAT AND DISTRIBUTION: This species is known only from Saint Brandon's Shoals (Cargados Carajos) in the western Indian Ocean (Figure 40). It has been collected from a variety of rock and coral reef habitats including surge channels and patch reefs around ledges, coral heads and rubble at depths ranging from 1 to 20 m.

COMPARISONS: *Pseudochromis magnificus* is a relatively distinctive species unlikely to be confused with other pseudochromines. The following combination of characters is diagnostic for the species: dorsal and anal fins with well-developed scale sheaths; segmented dorsal-fin rays 23-24 (usually 24) with all, or all but first, rays branched; segmented anal-fin rays 13-15 (usually 14); circumpeduncular scales 19-20 (usually 20); and anal-fin spines slender and weakly pungent to flexible, with the second spine about as stout as the third.

REMARKS: *Pseudochromis magnificus* is a moderately small species; the largest specimen examined measured 51.5 mm SL. Lubbock (1977) described and illustrated sexual dichromatism in this species. This was confirmed in the present study from a superficial examination of gonads of preserved specimens.

According to V.G. Springer (pers. comm.), the live coloration of males of this species is much more spectacular than noted above or by Lubbock (1977). Springer noted that the colour slides published here and by Lubbock are of relatively faded dead specimens that do not do justice to the beauty of the species.

ETYMOLOGY: The specific epithet is from the Latin for splendid or eminent with reference to the beautiful live

coloration of the male.

MATERIAL EXAMINED: SAINT BRANDON'S SHOALS (CARGADOS CARAJOS): USNM 257181, 1(0), USNM 290104, 1(0), USNM 290559, 1(0); Albatross Id, USNM 257750, 3(0), USNM 257751, 2(0); off northern tip of Saint Brandon's Shoals, USNM 257180, 8(8), 39.1-47.1 mm SL; Raphael Id, BMNH 1975.2.12:6, 1(1), 39.8 mm SL (paratype), BPBM 18036, 1(0), 35.6 mm SL (paratype), RUSI 1901, 1(1), 49.8 mm SL (holotype), USNM 214109, 1(0), 39.2 mm SL (paratype), USNM 216138, 19(19), 36.7-51.5 mm SL (47.7 and 47.8 mm SL specimens cleared and stained), USNM 257753, 4(0), USNM 257754, 8(0), USNM 257755, 5(0), USNM 257762, 3(0); Grande Pass, USNM 216237, 6(0), 32.4-48.4 mm SL (paratypes), USNM 257179, 1(0); Siren Id, USNM 257752, 1(0), USNM 257756, 1(0); Frigate Id, USNM 257758, 1(0), southern Saint Brandon's Shoals, USNM 257182, 2(0), USNM 257757, 2(0).

***Pseudochromis marshallensis* Schultz**
Orange-spotted Dottyback
Figure 51; Plates 9D-E; Table 9

Pseudochromis fuscus [*non* Müller & Troschel, 1849]; Fowler, 1931a: 332 (Boston Id).

Pseudochromis aurea marshallensis Schultz, 1953: 392, fig. 63 (type locality: Rongelap Id, Marshall Ids); Randall & Randall, 1987: 298 (list, Marshall Ids).

Pseudochromis xanthochir [*non* Bleeker, 1855a]; Burgess & Axelrod, 1975: fig. 157 (colour fig.; Marau, Solomon Ids).

Pseudochromis marshallensis; Allen, 1985: 2508, fig. 153 (list, Western Australia; colour fig.); Burgess et al., 1988: pl. 151 (left colour fig.); Allen & Swainston, 1988: 60, pl. 21, fig. 335; Paxton et al., 1989: 519 (list; distribution); Myers, 1989: 113, 274, pl. 37d (description; distribution; colour fig.); Burgess et al., 1991: 201 (colour fig.); Lieske & Myers, 1994: pl. 31, fig. 9 (colour fig.; habitat and distribution); Allen, 1997: 94, pl. 28-12 (description; distribution; colour fig.); Randall et al., 1997: 22, pl. 6, fig. D (Ogasawara Ids; colour fig.); Gill & Randall, 1998: 21, 23 (comparisons); Gill, 1999b: 2565 (key).

Pseudochromis aureus [*non* Seale, 1910]; Shen, 1984: fig. 291-7b (southern Taiwan).

Pseudochromis marchallensis [sic]; Kuiter, 1992: 43, fig. a (colour fig.).

DIAGNOSIS: *Pseudochromis marshallensis* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 24-27, usually 25; segmented anal-fin rays 11-14, usually 13; circumpeduncular scales 15-17, rarely 15 or 17; and scales of body each with indistinct to distinct pale yellow to pale brown (pale yellow to bright orange in life) basal spot.

DESCRIPTION (based on 129 specimens, 22.1-53.7 mm SL): dorsal-fin rays III,24-27, last 8-27 segmented rays branched (all or all but first 1-2 branched in specimens larger than about 30 mm SL); anal-fin rays III,11-14, last 6-14 segmented rays branched (all branched in specimens larger than about 25 mm SL); pectoral-fin rays 16-19; upper procurrent caudal-fin rays 5-8; lower procurrent caudal-fin rays 5-7; total caudal-fin rays 27-32; scales in lateral series 32-42; anterior lateral-line scales 22-32; anterior lateral line terminating beneath segmented dorsal-fin ray 13-21; posterior lateral-line scales 0-15 + 0-3; scales between lateral lines 3-5; horizontal scale rows above anal-fin origin II-I4 + I + 2-4 = 14-18; circumpeduncular scales 15-17; predorsal scales 16-26; scales behind eye 2-4; scales to

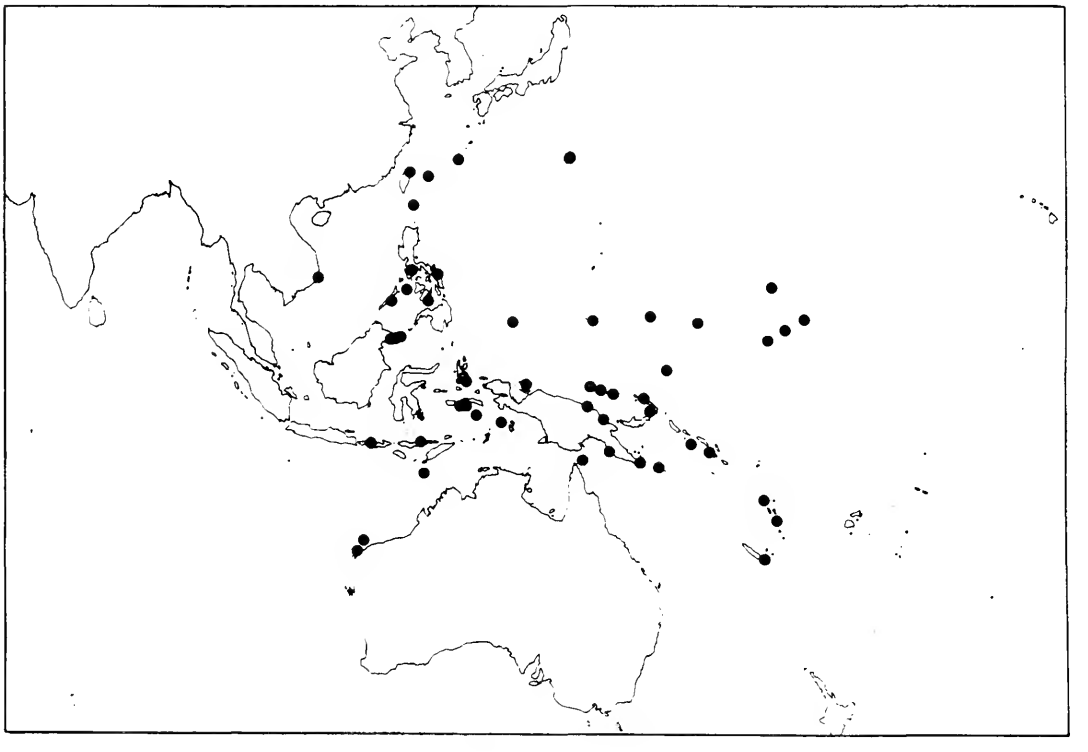

Figure 51. Distributional records for *Pseudochromis marshallensis*.

preopercular angle 3-5; gill rakers 4-7 + 11-15 = 15-22; pseudobranch filaments 7-12; circumorbital pores 17-34; preopercular pores 8-19; dentary pores 3-5; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without scales sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from mid AIO pores to posterior nasal pores; opercle with 2-7, usually relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed mainly on distal halves or tips of rakers only, although sometimes with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1 + 1*/1; dorsal-fin spines moderately stout to stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1*/1/1 + 1*; anal-fin spines moderately stout to stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout to stout and pungent; second segmented pelvic-fin ray longest; caudal fin rounded to emarginate; vertebrae 10 + 16; epineurals 13-15; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 2-3 rows of small conical teeth, forming chevron; palatine with 2-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 69 specimens, 21.3-49.8 mm SL): head length 24.2-31.0; orbit diameter 7.8-12.7; snout length 5.3-7.3; fleshy interorbital width 4.8-6.3; bony interorbital width 3.2-4.2; body width 11.3-13.6; snout tip to posterior tip of retroarticular bone 13.1-16.9; predorsal length 32.8-39.4; prepelvic length 30.8-36.4; posterior tip of retroarticular bone to pelvic-fin origin 18.0-23.8; dorsal-fin origin to pelvic-fin origin 25.7-30.5; dorsal-fin origin to middle dorsal-fin ray 30.5-36.4; dorsal-fin origin to anal-fin origin 39.1-46.7; pelvic-fin origin to anal-fin origin 27.7-34.2; middle dorsal-fin ray to dorsal-fin termination 18.9-26.3; middle dorsal-fin ray to anal-fin origin 24.1-29.1; anal-fin origin to dorsal-fin termination 29.4-36.2; anal-fin base length 21.4-26.4; dorsal-fin termination to anal-fin termination 14.7-18.1; dorsal-fin termination to caudal peduncle dorsal edge 11.1-14.2; dorsal-fin termination to caudal peduncle ventral edge 18.5-21.1; anal-fin termination to caudal peduncle dorsal edge 19.1-23.2; anal-fin termination to caudal peduncle ventral edge 11.9-16.2; first dorsal-fin spine 1.0-2.3; second dorsal-fin spine 3.8-6.6; third dorsal-fin spine 4.3-9.6; first segmented dorsal-fin ray 10.2-13.7; fourth last segmented dorsal-fin ray 12.9-17.4; first anal-fin spine 1.4-3.8; second anal-fin spine 4.7-11.2; third anal-fin spine 5.7-9.6; first segmented anal-fin ray 9.8-14.1; fourth last segmented anal-fin ray 12.7-16.5; third pectoral-fin ray 12.3-17.4; pelvic-fin spine 8.7-12.2; second segmented pelvic-fin ray 17.9-29.3; caudal-fin length 21.4-27.0.

Live coloration (based on photographs of specimens from northwestern Australia, Indonesia, the Philippines, Taiwan, and the Solomon and Caroline Ids; Plates 9D-E): head and body purple to purplish or bluish grey or dark olive, often with strong pink or red to bright yellow tinge, this usually most intense either on posterior part of body, or on head and anterior part of body, sometimes with both colours present at opposite ends of body; posteroventral rim of orbit yellowish grey to bright red, this bordered by curved pale to bright blue line; iris grey or brown to bright yellow or red, with blue suboval ring around pupil; scales of body and sometimes head and nape each usually with pale yellow to bright pinkish yellow or bright orange basal spot, these indistinct or absent in some specimens; dorsal fin bright pinkish or yellowish hyaline to greyish hyaline, with basal quarter of fin abruptly dark purple or dark blue to dark grey, remainder of fin with three to six narrow bright red to blue horizontal to slightly oblique lines; interradial membranes of first few segmented rays each with horizontally elongate bright yellow distal spot; dorsal fin sometimes uniformly bright yellow, either without markings or with series of dark grey stripes along middle part of fin; anal fin bluish or greyish hyaline to hyaline with mauve to dark grey basal stripe, remainder of fin with one to three indistinct to distinct pale pink to bright red stripes; basal part of caudal fin purplish grey or bright yellow, becoming greyish hyaline or bright yellowish hyaline posteriorly; upper and lower borders of caudal fin broadly and abruptly hyaline to pale pink, sometimes bordered proximally with narrow red to grey stripes; pectoral and pelvic fins pinkish or yellowish hyaline to hyaline.

Preserved coloration: pattern similar to live coloration, head and body becoming pale brown to dark purplish brown, paler ventrally; bright yellow to bright orange basal scale spots becoming pale yellow to pale brown, these often indistinct; dorsal and anal fins hyaline to dusky hyaline or pale brown, usually darker basally, with several thin, dark (if background hyaline) or pale (if background dusky hyaline) grey stripes; caudal fin pale brown, becoming dusky hyaline posteriorly, with broad pale grey to hyaline distal margins on upper and lower lobes; pectoral fins hyaline; pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis marshallensis* is widely distributed throughout the West Pacific, from Western Australia north through eastern Indonesia and the Philippines to southern Japan, east to the Marshall Ids and south to Vanuatu and New Caledonia (Figure 51). It has been collected from coral and rock reefs in lagoons, reef crests and reef slopes at depths ranging from 0.5 to 30 m.

COMPARISONS: *Pseudochromis marshallensis* is relatively distinctive in having the following combination of characters: segmented dorsal-fin rays 24-27, usually 25; segmented anal-fin rays 11-14, usually 13; second anal-fin spine much stouter than third; circumpeduncular scales 15-17, rarely 15 or 17; and scales of body each with an indistinct to distinct pale yellow to pale brown (pale yellow to bright orange in life) basal spot. Characters distinguishing *P. marshallensis* from similar species are discussed under the *Comparisons* sections for *P. alticaudex, P. andamanensis, P. flavopunctatus* and *P. litus*.

Table 9. Frequency distributions for selected meristic characters of *Pseudochromis marshallensis* specimens from different localities.

	Lower pr. C rays				Scales in lateral series											
	5	6	7	$\bar{x}$	32	33	34	35	36	37	38	39	40	41	42	$\bar{x}$
Ogasawara Ids	-	3	1	6.3	-	-	-	1	1	-	4	1	1	-	-	37.8
Ryukyu Ids	-	4	3	6.4	-	-	-	-	5	6	1	2	-	-	-	37.0
Taiwan	-	7	-	6.0	-	-	-	3	2	6	2	1	-	-	-	36.7
Vietnam	-	-	2	7.0	-	-	-	-	1	2	-	1	-	-	-	37.3
Batan Id	-	-	1		-	-	-	1	-	1	-	-	-	-	-	36.0
Mindoro	-	2	-	6.0	-	-	-	-	-	1	2	1	-	-	-	38.0
Negros	-	-	1		-	-	-	-	1	1	-	-	-	-	-	36.5
Siquijor	-	6	6	6.5	-	1	1	4	10	1	5	2	-	-	-	36.3
Widi Ids	-	-	1		-	-	-	-	-	1	-	1	-	-	-	38.0
Nusa Laut	-	1	4	6.8	-	-	-	-	6	1	-	2	1	-	-	37.1
Kai Ids	-	1	5	6.8	-	-	-	-	3	5	4	-	-	-	-	37.1
Gili Air	-	1	2	6.7	1	1	-	-	2	2	-	-	-	-	-	35.2
Flores	-	2	1	6.3	-	-	-	1	1	2	1	1	-	-	-	37.0
Ashmore Reef	1	3	6	6.5	-	-	-	8	7	2	2	1	-	-	-	36.1
North West Cape	-	2	3	6.6	-	-	-	1	2	7	-	-	-	-	-	36.6
Ifalik Atoll	-	1	4	6.8	-	-	-	-	3	3	3	1	-	-	-	37.2
Truk Ids	-	-	1		-	-	1	-	1	-	-	-	-	-	-	35.0
Pohnpei	-	3	7	6.7	-	-	-	1	5	6	3	3	-	-	-	37.1
Marshall Ids	-	4	6	6.6	-	-	-	5	7	5	3	1	-	-	1	36.7
Hermit Ids	-	2	8	6.8	-	-	-	1	2	9	6	2	-	-	-	37.3
Madang	-	3	3	6.5	-	-	-	-	4	2	4	2	1	-	-	37.7
Basilaki Id	-	2	5	6.7	-	-	-	1	5	4	4	-	-	-	-	36.8
Port Moresby	-	1	-		-	-	-	-	1	1	-	-	-	-	-	36.5
Torres Strait	-	1	1	6.5	-	-	-	-	1	1	1	1	-	-	-	37.5
Solomon Ids					-	-	-	-	3	-	1	-	-	-	-	36.5
Vanuatu	-	2	1	6.3	-	-	-	-	2	4	-	-	-	-	-	36.7
New Caledonia	-	1	1	6.5	-	-	-	-	-	-	4	-	-	-	-	38.0

	Anterior lateral-line scales												Lower gill rakers					
	22	23	24	25	26	27	28	29	30	31	32	$\bar{x}$	11	12	13	14	15	$\bar{x}$
Ogasawara Ids	-	-	-	1	-	-	-	6	-	1	-	28.8	4	-	-	-	-	11.0
Ryukyu Ids	-	-	-	1	2	4	3	-	1	1	-	27.5	2	5	-	-	-	11.7
Taiwan	-	-	-	-	1	4	2	2	3	2	-	28.6	4	3	-	-	-	11.4
Vietnam	-	-	-	-	1	-	1	2	-	-	-	28.0	1	1	-	-	-	11.5
Batan Id	-	-	-	1	1	-	-	-	-	-	-	25.5	-	1	-	-	-	
Mindoro	-	-	-	-	-	-	1	1	1	1	-	29.5	-	2	-	-	-	12.0
Negros	-	-	-	-	-	2	-	-	-	-	-	27.0						
Siquijor	-	1	-	4	5	6	3	2	1	1	-	26.9	9	3	-	-	-	11.3
Widi Ids	-	-	-	-	-	-	1	-	1	-	-	29.0	1	-	-	-	-	
Nusa Laut	-	-	-	1	3	1	1	1	2	-	1	27.9	3	1	1	-	-	11.6
Kai Ids	-	-	-	-	3	1	2	4	1	-	-	27.9	6	-	-	-	-	11.0
Gili Air	1	-	1	-	-	1	2	-	-	-	-	25.8	2	1	-	-	-	11.3
Flores	-	-	-	1	1	-	2	1	-	-	-	27.2	3	-	-	-	-	11.0
Ashmore Reef	-	-	3	4	3	4	3	2	-	1	-	26.6	5	4	-	1	-	11.7
North West Cape	-	-	1	-	1	3	4	-	1	-	-	27.3	1	1	1	1	1	13.0
Ifalik Atoll	-	-	-	-	-	2	2	4	-	1	-	28.6	5	-	-	-	-	11.0
Truk Ids	-	-	-	1	-	1	-	-	-	-	-	26.0	1	-	-	-	-	
Pohnpei	-	-	-	1	2	5	5	4	2	-	-	27.8	6	4	-	-	-	11.4
Marshall Ids	-	-	-	5	4	7	1	-	-	-	-	26.2	7	4	-	-	-	11.4
Hermit Ids	-	-	-	1	-	2	6	3	4	2	-	28.7	5	5	-	-	-	11.5
Madang	-	-	-	1	2	1	1	3	3	-	1	28.4	2	3	1	-	-	11.8
Basilaki Id	-	-	1	1	1	4	5	1	-	-	-	27.1	7	-	-	-	-	11.0
Port Moresby	-	-	-	-	-	1	1	-	-	-	-	27.5	-	1	-	-	-	
Torres Strait	-	-	-	-	-	-	2	-	-	2	-	29.5	2	-	-	-	-	11.0
Solomon Ids	-	-	-	-	2	-	-	2	-	-	-	27.5	1	1	-	-	-	11.5
Vanuatu	-	-	-	2	2	1	1	-	-	-	-	26.2	2	1	-	-	-	11.3
New Caledonia	-	-	-	-	-	-	2	2	-	-	-	28.5	1	-	1	-	-	12.0

Table 9. (continued)

	Predorsal scales											
	16	17	18	19	20	21	22	23	24	25	26	$\bar{x}$
Ogasawara Ids	-	-	-	3	-	1	-	-	-	-	-	19.5
Ryukyu Ids	-	-	1	2	3	1	-	-	-	-	-	19.6
Taiwan	-	-	2	3	1	-	1	-	-	-	-	19.3
Vietnam	1	-	-	-	-	-	1	-	-	-	-	19.0
Batan Id	-	-	-	-	1	-	-	-	-	-	-	
Mindoro	-	-	-	-	-	2	-	-	-	-	-	21.0
Negros	-	-	-	-	-	1	-	-	-	-	-	
Siquijor	-	-	2	4	4	2	-	-	-	-	-	19.5
Widi Ids	-	-	1	-	-	-	-	-	-	-	-	
Nusa Laut	-	-	-	-	-	2	2	1	-	-	-	21.8
Kai Ids	-	-	1	-	5	-	-	-	-	-	-	19.7
Gili Air	-	-	4	-	-	-	-	-	-	-	-	18.0
Flores	-	-	-	1	1	-	-	1	-	-	-	20.7
Ashmore Reef	-	-	-	-	1	2	2	2	1	-	1	22.4
North West Cape	-	-	-	-	1	-	2	-	2	-	1	23.0
Ifalik Atoll	-	-	1	2	1	-	-	-	-	-	-	19.0
Truk Ids	-	-	-	1	-	-	-	-	-	-	-	
Pohnpei	-	-	1	3	4	1	1	-	-	-	-	19.8
Marshall Ids	1	2	1	2	3	2	-	-	-	-	-	18.9
Hermit Ids	-	-	-	2	3	4	-	1	-	-	-	20.5
Madang	-	-	-	-	-	3	1	-	-	-	1	22.2
Basilaki Id	-	-	-	-	-	3	2	1	-	-	-	21.6
Port Moresby	-	-	-	-	-	-	-	1	-	-	-	
Torres Strait	-	-	-	-	-	-	-	-	-	-	1	
Solomon Ids	-	-	-	-	2	-	-	-	-	-	-	20.0
Vanuatu	-	-	-	1	1	-	1	-	-	-	-	20.3
New Caledonia	-	-	-	-	1	-	-	-	-	-	1	23.0

REMARKS: *Pseudochromis marshallensis* is a relatively small species; the largest specimen examined measured 53.7 mm SL. The live coloration has been illustrated by Burgess & Axelrod (1975), Allen (1985), Burgess et al. (1988, 1991), Myers (1989) and Kuiter (1992).

Pseudochromis marshallensis is one of the most widely distributed species. It possibly exhibits geographical variation in dorsal-fin coloration: specimens from the vicinity of Madang, Papua New Guinea, and from Taiwan usually have an entirely yellow dorsal fin. However, individuals observed by me off North West Cape, Western Australia, showed considerable variation in dorsal-fin coloration; most had yellow confined to the anterior part of the fin, but some had an entirely yellow fin (see Plate 9E). Never-the-less, given the wide distribution of the species, and the presence of geographic variation in some meristic characters (Table 9), it is likely that further studies will justify subdivision of the species as currently diagnosed into two or more species.

ETYMOLOGY: The specific epithet is for the type locality.

MATERIAL EXAMINED: OGASAWARA IDS: Ani-Jima, bay S of Kabusha Point, BPBM 35147, 5(4, 41.8-46.5 mm SL), 20.2-46.5 mm SL. RYUKYU IDS, JAPAN: Okinawa, S of Komesu, USNM 290980, 1(0); Ishigaki, BPBM 17692, 5(5), 38.1-43.3 mm SL; Ishigaki, S side of Taketomi Id, BPBM 8735, 2(2), 34.7-38.2 mm SL. VIETNAM: Hon Lon, Ving Damlon, CAS 60974, 1(1), 35.1 mm SL; SW shore of Hon Lon, CAS 60988, 1(1), 36.7 mm SL. TAIWAN: Yeh-Liu, USNM 290561, 5(5), 33.2-49.6 mm SL, USNM 290564, 1(1), 53.7 mm SL, USNM 290688, 1(1), 49.1 mm SL. PHILIPPINES: Batan Id, White Beach, USNM 291620, 1(1), 36.3 mm SL; Mindoro, Puerto Galera, LACM 42489-65, 2(2), 40.7-43.5 mm SL, LACM 42490-81, 3(0), 32.0-41.0 mm SL, LACM 42491-79, 3(0), 37.0-44.0 mm SL; Cuyo Ids, Bararin Id, USNM 290547, 1(0); Palawan, Puerto Princesa, Pagnagtaran Point, USNM 290549, 3(0); Samar, Palapag, USNM 146608, 1(0); Negros, Dumaguete, CAS-SU 28514, 1(1), 35.5 mm SL; Siquijor Id, 1 km S of San Juan, USNM 290463, 12(12), 32.0-45.5 mm SL; Sulu Archipelago, Tawitawi Id, USNM 146618, 1(0); Sulu Archipelago, Tumindao Id, USNM 146619, 1(0). SABAH, MALAYSIA: Darvel Bay, Pulau Bohidulong, USNM 290434, 6(0). INDONESIA: Widi Ids, SE side of Dodora Id, BPBM 34217, 1(1), 36.3 mm SL; Nusa Laut, Tandjung Tala, USNM 209895, 5(5), 33.6-41.2 mm SL; Ambon, Ambon Bay, off Silale village, WAM P.25236-015, 1(0), 37.8 mm SL; Lombok, 30 km N of Mataram, Gili Air Id, SMNS 18685 4(3, 34.0-40.3 mm SL), 34.0-41.8 mm SL; Banda Ids, Goenoeng Api, USNM 278114, 10(0); Kai Ids, off NW corner of Tayandu Id, USNM 246242, 6(6), 24.8-40.0 mm SL; Flores, off Pertamina oil storage site, Waipare Reef, BPBM 32230, 2(2), 30.6-34.2 mm SL; Flores, N of Maumere, Wailiti Reef, BPBM 32175, 1(1), 39.8 mm SL; Irian Jaya, Biak Id, W shore of Tandjung Mankekesdi, USNM 246224, 7(0). NORTHWESTERN AUSTRALIA: Timor Sea, Ashmore Reef, West Pass, WAM P.29044-051, 4(4), 35.5-40.1 mm SL; Timor Sea, Ashmore Reef, East Pass, WAM P.29049-023, 4(4), 28.0-39.0 mm SL; Timor Sea, Ashmore Reef, WAM P.29049-030, 2(2), 29.3-32.4 mm SL; Western Australia, Monte Bello Ids, Daisey Id, WAM P.27978-003, 8(0), 31.2-39.6 mm SL; Western Australia, Monte Bello Ids, Southeast Id, WAM P.27980-029, 22(0), 31.0-53.0 mm SL; Western Australia, Bessieres Id, MPM

32611, 6(0), 36.5-48.0 mm SL; Western Australia, South Muiron Id, WAM P.25815-006, 7(0), 29.5-40.0 mm SL, WAM P.25826-021, 1(0), 33.0 mm SL; Western Australia, North West Cape, outer reef off Tantabiddi Creek, WAM P.25370-023, 5(5), 32.2-49.2 mm SL. BELAU: Urukthapel Id, N of Ankosu Point, CAS 60995, 3(0), 30.0-43.8 mm SL. CAROLINE IDS: Ifalik Atoll, reef flat between Elangalap and Ella Islets, AMS I.31410-001, 8(5, 31.5-43.1 mm SL), 30.3-43.1 mm SL, CAS 60883, 9(0), 28.5-42.0 mm SL; Truk Ids, NE coast of Falo Id, NSMT uncat., 1(1), 36.1 mm SL; N coast of Pohnpei, USNM 224314, 10(10), 31.6-41.6 mm SL; Pohnpei, Nankapenrapam Reef, USNM 223043, 1(0); Kapingamarangi Atoll, Tiurahi Lagoon, AMS I.31412-001, 5(0), 26.0-37.0 mm SL, CAS 60926, 6(0), 15.0-41.8 mm SL. MARSHALL IDS: Rongelap Atoll, N end of Rongelap Id, USNM 140629, 1(1), 43.2 mm SL (holotype of *P. aurea marshallensis* Schultz); Bikar Id lagoon, USNM 290643, 5(5), 21.3-42.4 mm SL; Arno Atoll, Eoneb-Je Id, USNM 166733, 1(0); Jaluit Atoll, Lijeron Id, USNM 290136, 5(5), 22.6-38.1 mm SL; Ebon Id (= Boston Id), RMNH 11100, 1(0), 41.0 mm SL. PAPUA NEW GUINEA: channel between Ninigo and Pelleluhu Groups, USNM 290328, 2(0); Hermit Ids, N side of West Entrance, USNM 290428, 10(10), 22.1-45.0 mm SL; Admiralty Ids, Los Negros Id, SE point at aerodrome, WAM P.27825-043, 3(0); New Ireland, N of Kavieng, USNM 292023, 2(0); New Britain, Blanche Bay, AMS I.17503-024, 1(0), 36.0 mm SL; Mushu Id, USNM 246239, 9(0); between Pig Id and Rasch Pass, WAM P.30624-012, 5(5), 40.5-47.8 mm SL; Little Pig Id, CAS 65794, 3(0), 33.2-46.3 mm SL; Madang, S end of Beliau Id, AMS I.17080-022, 1(1), 49.8 mm SL (subsequently cleared and stained); Wongat Id, CAS 65796, 4(0), 37.0-47.7 mm SL; Basilaki Id, USNM 292052, 7(7), 30.3-48.8 mm SL; Louisaide Archipelago, Bagaman Id, CAS 56567, 1(0), 26.1 mm SL; Port Moresby, AMS I.17262-057, 1(1), 44.4 mm SL. TORRES STRAIT IDS, AUSTRALIA: Murray Id, QM I.100, 2(2), 39.8-41.1 mm SL (paralectotypes of *O. nebulosum* De Vis). SOLOMON IDS: New Georgia, Blackett Straits, Wana-wana Id, USNM 290605, 4(0); Guadalcanal, Honiara, ROM 42686, 2(0), 26.5-44.0 mm SL, ROM 42319, 11(0), 13.5-41.0 mm SL; Guadalcanal, 12 km W of Honiara, wreck of "Ruaniu", ROM 42264, 1(1), 46.1 mm SL; Guadalcanal, Boneg Id, ROM 42678, 1(1), 37.5 mm SL. VANUATU: Espiritu Santo, USNM 290328, 7(0); Efate Id, Vila Harbour, CAS 60907, 3(3), 35.3-43.3 mm SL. NEW CALEDONIA: MNHN 1980-804, 2(2), 41.8-42.0 mm SL; Baie de Prony, Bonne Anse, BPBM 27122, 1(0), 49.0 mm SL.

Pseudochromis melanurus **sp. nov.**

Blacktail Dottyback

Figure 34; Plates 9F-G

Pseudochromis tapeinosoma [*non* Bleeker, 1853a]; Herre, 1936: 167 (description; Suva, Fiji); Fowler, 1959: 223 (description; Suva, Fiji).

Pseudochromis sp.; Gill & Allen, 1996: 36, tab. 1, fig. 5 (comparison; colour fig.).

Pseudochromis sp. 5; Gill, 1999b: 2564 (key).

HOLOTYPE: USNM 257165, 35.4 mm SL, Fiji, large rock on SW corner of Malolo Lailai (17°47'S 177°13'E), along shore and in tidal pools, 0.3 m, V.G. Springer et al., 24 May 1982.

PARATYPES: BMNH 1897.8.23.214, 1: 33.6 mm SL, Fiji, J.S. Gardiner; ROM 1371CS, 3: 25.0-39.5 mm SL (cleared and stained), Fiji, Great Astrolabe Reef, Dravuni Id, shallow reef off first black rock, 300 m S of University of South Pacific research station (18°45'15"S 178°31'59"E), R. Winterbottom, A.R. Emery, F. Emery and R. McKinnon, 20 March 1983; ROM 46833, 2: 25.3-26.0 mm SL, Fiji, Great Astrolabe Reef, 5 km NW of Dravuni Id on inner edge of lee (W) reef, A.R. Emery, R. Winterbottom, R. McKinnon and T. Emery, 31 March 1983; USNM 257167, 13: 31.0-39.5 mm SL, Fiji, Viwa Id, small islet on Viwa Reef (17°11'S 176°54'E), 0-30 m, V.G. Springer et al., 27 May 1982; USNM 359488, 7: 27.3-33.8 mm SL, collected with holotype; AMS I.18361-019, 3: 31.2-33.4 mm SL, Fiji, Viti Levu, Suva, B. Carlson and B. Goldman, 7 March 1974; WAM P.30792-001, 2: 33.0-39.2 mm SL, Fiji, Viti Levu, Suva Harbour, Rattail Pass, rotenone, R. Winterbottom, 14 April 1983; USNM 333192, 2: 33.1-34.0 mm SL, Tonga, Tongatapu Id, NW coast at Ha'atafu Beach, ocean side of reef crest (21°03'58"S 175°20'03"W), mostly dead coral bottom, 5.4-7.8 m, J.T. Williams et al., 21 October 1993; USNM 333894, 1: 40.3 mm SL, Tonga, Tongatapu Id, NW coast at Ha'atafu Beach (21°03'57"S 175°19'45"W), sandy beach and adjacent coral rock at shore, 0-1.2 m, J.T. Williams, D.G. Smith, E.A. Powers, D. McDermott and M.A. McCormick, 26 October 1993; USNM 334192, 3: 36.0-37.8 mm SL, Tonga, Ha'apai Group, Ofolanga Id, on reef flat near its crest at Mahu'ama Point (19°36'06"S 174°27'33"W), coral channels into reef with sand bottom, 0-1.5 m, A. Palaki, M.A. McCormick, E.A. Powers et al., 12 November 1993; USNM 329737, 3: 32.0-37.1 mm SL, Tonga, Eua, fringing reef at base of cliff on NW shore (21°18'15"S 174°26'20"W), spur and groove in surge zone, rocky surge channels, 0-10.5 m, J.T. Williams et al., 3 November 1993; USNM 334246, 36.3 mm SL, Tonga, Eua, tidal flat just S of Ohonna Harbour, hard bottom with live coral, small channels and pools, some porous fossil coral rock, 0-1 m, J.T. Williams, 2 November 1993.

DIAGNOSIS: *Pseudochromis melanurus* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 21-22, rarely 21; segmented anal-fin rays 12-14, rarely 12 or 14; anal-fin spines weakly pungent to flexible, the second spine varying from about as stout to less stout than the third; scales in lateral series 29-35, usually 30-33; anterior lateral-line scales 23-28, usually 24-27; and scales below anterior lateral line 10-12. Males of the species are distinctive in coloration: head and body dark grey to black (dark brown to black in preservative), with lower part of head and body in front of anal-fin origin yellowish brown (pale brown to brown in preservative).

DESCRIPTION (based on 42 specimens, 25.3-40.3 mm SL; minimum and maximum value ranges given first for all type specimens, followed, where different, by values for holotype enclosed in parentheses): dorsal-fin rays III,21-22 (III,22), all or all but first (all) segmented rays branched; anal-fin rays III,12-14 (III,13), all segmented rays branched; pectoral-fin rays 15-19 (18/18); upper procurrent caudal-fin rays 6-8 (8); lower procurrent caudal-fin rays 6-7 (7); total caudal-fin rays 29-32 (32); scales in lateral series 29-35 (31/30); anterior lateral-line scales 23-28 (26/25); anterior lateral line terminating beneath segmented dorsal-fin ray 15-19 (18/18); posterior lateral-line

scales 4-10 + 0-2 (9 + 1/7 + 1); scales between lateral lines 2-3 (3/3); horizontal scale rows above anal-fin origin 10-12 + 1 + 2-3 = 13-16 (11 + 1 + 3/10 + 1 + 2); circumpeduncular scales 16; predorsal scales 12-16 (13); scales behind eye 2-4 (4); scales to preopercular angle 3-4 (4); gill rakers 3-5 + 10-12 = 13-17 (5 + 12); pseudobranch filaments 7-9 (8); circumorbital pores 17-28 (21/21); preopercular pores 9-20 (12/13); dentary pores 4; posterior interorbital pores 1-2 (1).

Lower lip usually complete, although sometimes with weak interruption; dorsal and anal fins without scale sheaths, although often with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from middle AIO pores to midway between anterior AIO and posterior nasal pores; opercle with 0-8, usually small, indistinct serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or with well-developed teeth mainly confined to raker tips; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1/1/1/1 + 1*/1/1/1 or S/S/S + 3/1 + 1/1/1/1/1/1/1/1/1/1 + 1/1 (S/S/S + 3/1 + 1/1/1/1/1/1/1/1/1/1 + 1/1); dorsal-fin spines slender and weakly pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1/1; anal-fin spines slender and weakly pungent to flexible, second spine varying from about as stout to less stout than third; pelvic-fin spine slender and weakly pungent to flexible; second segmented pelvic-fin ray longest, although sometimes subequal to third; caudal fin rounded, often with posterior margin weakly rounded to truncate; vertebrae 10 + 16-17 (one of 24 specimens with 10 + 17) (10 + 16); epineurals 14-16 (15); epurals 2.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 12 specimens, 33.0-40.3 mm SL): head length 23.8-26.1 (25.1); orbit diameter 7.9-9.9 (9.0); snout length 4.6-5.8 (5.6); fleshy interorbital width 3.6-4.2 (4.0); bony interorbital width 2.3-3.0 (2.5); body width 11.4-12.9 (12.4); snout tip to posterior tip of retroarticular bone 12.9-14.2 (13.6); predorsal length 31.9-34.7 (33.9); prepelvic length 28.7-31.2 (30.2); posterior tip of retroarticular bone to pelvic-fin origin 16.9-18.6 (17.5); dorsal-fin origin to pelvic-fin origin 24.3-27.6 (26.3); dorsal-fin origin to middle dorsal-fin ray 30.6-34.3 (31.9); dorsal-fin origin to anal-fin origin 39.2-42.1 (39.3); pelvic-fin origin to anal-fin origin 26.7-34.7 (29.1); middle dorsal-fin ray to dorsal-fin termination 24.2-28.9 (26.3); middle dorsal-fin ray to anal-fin origin 24.2-28.1 (26.3); anal-fin origin to dorsal-fin termination 31.9-35.6 (35.0); anal-fin base length 23.1-26.8 (25.7); dorsal-fin termination to anal-fin termination 15.5-20.1 (16.9); dorsal-fin termination to caudal peduncle dorsal edge 10.7-15.7 (13.0); dorsal-fin termination to caudal peduncle ventral edge 18.4-22.3 (21.2); anal-fin termination to caudal peduncle dorsal edge 19.5-24.8 (23.4); anal-fin termination to caudal peduncle ventral edge 12.7-16.9 (15.8); first dorsal-fin spine 1.1-2.5 (2.5); second dorsal-fin spine 3.6-5.9 (4.5); third dorsal-fin spine 5.6-8.2 (broken); first segmented dorsal-fin ray 10.8-11.9 (11.6); fourth last segmented dorsal-fin ray 14.4-17.5 (15.5); first anal-fin spine 0.8-2.4 (2.3); second anal-fin spine 2.8-5.5 (4.0); third anal-fin spine 5.6-7.6 (6.2); first segmented anal-fin ray 10.2-12.1 (10.2); fourth last segmented anal-fin ray 13.8-15.8 (13.8); third pectoral-fin ray 14.4-17.5 (14.7); pelvic-fin spine 8.4-10.3 (9.0); second segmented pelvic-fin ray 18.0-21.3 (18.4); caudal-fin length 21.8-25.5 (22.3).

Live coloration: Females (based on a photograph of a paratype from Great Astrolabe Reef, Fiji; Plate 9F): head and body dark grey-brown, paler ventrally, becoming yellowish brown on caudal peduncle; ventral part of orbital rim pale bluish grey; iris greyish yellow, becoming orange ventrally, with dark blue suboval ring around pupil; dorsal and anal fins dark grey basally, becoming greyish hyaline distally and yellowish brown posteriorly, with one or two dark grey oblique stripes through middle part of fin; caudal fin yellowish brown basally, remainder of fin bright yellow; pectoral and pelvic fins brownish hyaline. Males (based on a photograph of a paratype from Eua, Tonga; Plate 9G): dorsal contour of head and body above horizontal part of anterior lateral line dark grey to black, remainder of head yellowish brown; iris yellowish brown, with blue suboval ring around pupil; breast and abdomen below anterior lateral line yellowish brown, becoming dark grey to black above anal fin and on caudal peduncle; dorsal fin dark grey to black, with distal margin greyish hyaline; anal fin dark grey to black basally, becoming greyish hyaline distally; caudal fin dark grey to black, with upper and lower margins pale grey to greyish hyaline; pectoral fins brownish hyaline; pelvic fins yellowish brown.

Preserved coloration: Juveniles and females: pattern similar to live coloration, head and body becoming brown, paler ventrally; dorsal and anal fins dark grey brown to brown basally, pale brown to brownish hyaline distally; caudal fin brown to brownish grey basally, becoming pale brown to brownish hyaline posteriorly, usually with upper and lower edges abruptly pale brown to brownish hyaline; pale brown to brownish upper and lower edges often bordered proximally with greyish brown to dark grey stripes; pectoral fins brownish hyaline; pelvic fins pale brown to brownish hyaline. Males: pattern similar to live coloration, yellowish brown areas on head and body becoming pale brown to brown; dark grey to black coloration on head and body becoming dark brown to black; dark markings on dorsal, anal and caudal fins remain, becoming dark grey-brown to black; pale grey and hyaline markings on dorsal, anal and caudal fins becoming pale brown to brownish hyaline; pectoral fins brownish hyaline; pelvic fins pale brown to brownish hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis melanurus* is known only from Fiji and Tonga (Figure 34). It has been collected from tidal pools and rock and coral reefs, often in high surge areas, at depths ranging to 10.5 m.

COMPARISONS: *Pseudochromis melanurus* closely resembles *P. coccinicauda* from the eastern and central Indian

Ocean, *P. cyanotaenia* from the eastern Indian Ocean and West Pacific (east to the Gilbert Ids), *P. tapeinosoma* from the eastern Indian Ocean and West Pacific (east to the Solomon Ids) and *P. viridis* from Christmas Id, Indian Ocean in most morphometric and meristic values, particularly in having relatively low numbers of segmented dorsal- and anal-fin rays (usually 22 and 13, respectively), 16 circumpeduncular scales and only two epurals. Characters distinguishing the five species are discussed under *Comparisons* for *P. coccinicauda* (see also Gill & Allen, 1996: 36, tab. 1).

REMARKS: *Pseudochromis melanurus* is a relatively small species; the largest specimen examined measured 40.3 mm SL. Gill & Allen (1996) discuss sexual dimorphism in the species and provide a colour photograph of a male.

A paratype in the Natural History Museum was collected from Fiji by J.S. Gardiner and originally misidentified as *P. fuscus* (presumably by A. Günther). No published references were found for this record, but they possibly exist; *P. fuscus* is not known east of Vanuatu. Ironically, another case of confusion of these two very different species exists: Fowler's (1959) account of *P. tapeinosoma* is based on specimens of *P. melanurus* from Fiji, but his illustration (*loc. cit.*, fig. 96) is of a specimen of *P. fuscus* from the Philippines.

ETYMOLOGY: The specific epithet is a combination of the Greek *melas*, black, and *oura*, tail, in allusion to the distinctive male coloration.

MATERIAL EXAMINED (additional to above type material): FIJI: Great Astrolabe Reef, N of Vuro Id, USNM 290324, 5(0); Viti Levu, Makuluva Id, ANSP 93921, 8(0), 16.2-34.6 mm SL, ANSP 93929, 7(0), 24.0-35.5 mm SL; Kandavu, Levuka, USNM 257166, 2(0); Lau Ids, Yangasa Cluster, Navutu Ira Id, USNM 257168, 1(0).

Pseudochromis melas Lubbock

Dark Dottyback

Figure 31; Plates 9H-I

Pseudochromis melas Lubbock, 1977: 8, pls 1d and 3a (type locality: Wasin Id, Shimoni, Kenya); Smith, 1980: 176 (Maputaland, South Africa); Smith, 1986: 540, pl. 44, fig. 169.5; Allen & Steene, 1987: pl. 32, fig. 4 (Sodwana Bay, South Africa); Burgess et al., 1988: pl. 155 (colour fig.); Burgess et al., 1991: 208 (colour fig.); Masuda & Allen, 1993: 130, fig. C (colour fig.); Gill & Randall, 1994: 16 (comparison); Lieske & Myers, 1994: pl. 31, fig. 12 (colour fig.; habitat and distribution); Smale et al., 1995: 110, pl. 64, fig B (otolith morphology); Debelius, 1996: 113 (colour fig.).

Pseudochromis pesi [*non* Lubbock, 1975]; Smith, 1980: 176 (Maputaland, South Africa); Smith, 1986: 541, pl.46, fig. 169.7 (Sodwana Bay record only).

DIAGNOSIS: *Pseudochromis melas* is distinguished from congeners in having the following character combination: segmented dorsal-fin rays 25-27, usually 26; segmented anal-fin rays 14-16, usually 15; pectoral-fin rays 18-20, usually 19; middle dorsal-fin ray to anal-fin origin 26.3-30.0; large black spot present on opercular flap; and head and body either uniform dark brown in preservative, or dark brown on the upper part with the remainder of head and body abruptly pale yellow to pale brown.

DESCRIPTION (based on 33 specimens, 23.1-79.3 mm SL): dorsal-fin rays III,25-27, last 11-27 segmented rays branched (all or all but first 1-2 branched in specimens larger than about 35 mm SL); anal-fin rays III,14-16, last 12-15 segmented rays branched (all or all but first branched in specimens larger than 35 mm SL); pectoral-fin rays 18-20; upper procurrent caudal-fin rays 6-8; lower procurrent caudal-fin rays 5-8; total caudal-fin rays 29-33; scales in lateral series 39-45; anterior lateral-line scales 28-37; anterior lateral line terminating beneath segmented dorsal-fin ray 15-22; posterior lateral-line scales 2-13 + 0-2; scales between lateral lines 3-5; horizontal scale rows above anal-fin origin 13-17 + 1 + 2-4 = 16-21; circumpeduncular scales 19-22; predorsal scales 18-23; scales behind eye 2-5; scales to preopercular angle 4-7; gill rakers 5-7 + 11-14 = 16-20; pseudobranch filaments 9-15; circumorbital pores 19-47; preopercular pores 11-75; dentary pores 3-5; posterior interorbital pores 1-3.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of posterior AIO pores to anterior AIO pores; opercle with 4-8 indistinct to moderately strong serrations; teeth of outer ceratobranchial-1 gill rakers usually well developed on raker tips only, but often with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1 + 1*/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1*/1; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray longest; caudal fin rounded, sometimes with posterior margin slightly rounded to truncate; vertebrae 10 + 16; epineurals 14-17; epurals 3.

Upper jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 4-7 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 2-4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 20 specimens, 23.1-79.3 mm SL): head length 23.2-31.2; orbit diameter 7.6-13.0; snout length 5.8-6.9; fleshy interorbital width 5.0-5.6; bony interorbital width 3.2-4.0; body width 11.4-13.4; snout tip to posterior tip of retroarticular bone 13.5-16.5; predorsal length 30.7-39.4; prepelvic length 31.0-35.4; posterior tip of retroarticular bone to pelvic-fin origin 17.0-21.1; dorsal-fin origin to pelvic-fin origin 25.6-30.9; dorsal-fin origin to middle dorsal-fin ray 31.2-38.2; dorsal-fin origin to anal-fin origin 41.2-44.5; pelvic-fin origin to anal-fin origin 28.5-35.5; middle dorsal-fin ray to

dorsal-fin termination 23.1-27.6; middle dorsal-fin ray to anal-fin origin 26.3-30.0; anal-fin origin to dorsal-fin termination 33.1-37.3; anal-fin base length 24.5-30.0; dorsal-fin termination to anal-fin termination 15.5-18.1; dorsal-fin termination to caudal peduncle dorsal edge 9.0-11.5; dorsal-fin termination to caudal peduncle ventral edge 17.9-19.8; anal-fin termination to caudal peduncle dorsal edge 18.2-22.2; anal-fin termination to caudal peduncle ventral edge 10.2-12.2; first dorsal-fin spine 2.4-3.9; second dorsal-fin spine 5.2-7.5; third dorsal-fin spine 6.9-10.0; first segmented dorsal-fin ray 10.9-13.4; fourth last segmented dorsal-fin ray 16.7-20.6; first anal-fin spine 1.7-3.3; second anal-fin spine 4.6-6.9; third anal-fin spine 5.5-7.8; first segmented anal-fin ray 9.7-12.1; fourth last segmented anal-fin ray 13.1-18.8; third pectoral-fin ray 13.9-18.2; pelvic-fin spine 9.2-12.4; second segmented pelvic-fin ray 19.7-27.6; caudal-fin length 25.4-29.2.

Live coloration: Pale form (based on photographs of specimens from Natal, South Africa; Plate 9H): dorsal contour of head and body brown to dark brown; remainder of body yellowish brown, becoming pinkish on lower part of abdomen; lower part of head yellowish brown to grey; opercular flap with large black spot, this bordered posteriorly by narrow gold line; iris yellow, becoming grey on outer part, with blue suboval ring around pupil; several rows of small dark brown to black spots present anteriorly on body within brown to dark brown area; pale yellowish brown oblique stripe extending above gill opening from midposterior edge of eye to base of last few dorsal-fin rays sometimes present; dorsal fin yellowish grey to brown with two or three rows of black spots along middle and distal part of fin, and brown to black spot at base of each ray; anal fin bright yellow basally, becoming hyaline distally, with blue-grey streak or spot at base of each ray; posterior part of anal fin sometimes with several black spots or streaks; caudal fin bright yellow, usually with several vertical or convex rows of small black spots; pectoral fins hyaline; pelvic fins pale yellow to hyaline. Dark form (based on photographs of specimens from Natal and Kenya; Plate 9I): head and body uniform dark bluish to brownish grey, paler ventrally; large dark blue to black spot on opercular flap, this bordered posteriorly by narrow gold line; iris yellow, becoming grey on outer part, with blue suboval ring around pupil; indistinct dark bluish grey spots present anteriorly below anterior lateral line; dorsal, anal and caudal fins dark bluish grey with bright blue distal margins, sometimes with few scattered indistinct dark grey spots; pectoral fins hyaline, dusky hyaline basally; pelvic fins dark grey to black.

Preserved coloration: Pale form: pattern similar to live coloration, head and body coloration remains, becoming paler; black spots on dorsal fin remain, remainder of fin becoming dusky hyaline to brown; anal fin becoming dusky hyaline to hyaline, sometimes with several scattered black spots; black spots on caudal fin remain, remainder of fin becoming yellowish brown basally and paler brown to hyaline posteriorly; pectoral fins hyaline; pelvic fins pale yellowish brown to hyaline. Dark form: pattern similar to live coloration, head and body becoming dark brown; dark spots on anterior part of body and black opercular flap spot remain; fin colourations remain.

HABITAT AND DISTRIBUTION: *Pseudochromis melas* is known only from the east coast of Africa, from Shimoni, Kenya, south to Aliwal Shoal, South Africa (Figure 31). It has been collected from coral and rock reefs on reef slopes at depths ranging from 15 to 20 m.

COMPARISONS: This species differs from all other pseudochromines except *P. aureolineatus* from the Comoros Ids, *P. punctatus* from off the coast of Somalia to central Oman, and *P. pesi* from the Red Sea in having the following characters: segmented dorsal-fin rays 25-27, usually 26; segmented anal-fin rays 14-16, usually 15; circumpeduncular scales 19-22, usually 20; scales in lateral series 39-45; and (except in the dark form of *P. melas*) similar preserved colourations (dark spot present on the opercular flap; upper part of the head and body brown to dark brown, the remainder of head and body abruptly pale yellow to pale brown). Characters distinguishing the four species are discussed under *Comparisons* for *P. aureolineatus*.

REMARKS: *Pseudochromis melas* is a moderately large species; the largest specimen examined measured 79.3 mm SL. As noted above, this species has dark and pale colour forms; the pale form has been previously confused with *P. pesi*. The dark colour form has been illustrated by Lubbock (1977), Smith (1986: pl. 144, fig. 169.5), Allen & Steene (1987), Burgess et al. (1988, 1991), Debelius (1993, 1996) and Masuda & Allen (1993), and the pale form has been illustrated by Smith (1986: pl. 146, fig. 169.7). No obvious ontogenetic or sexual relationships were noted between the two colour forms; however, further study is needed.

ETYMOLOGY: The specific epithet is from the Greek for black and alludes to the coloration of the type specimens.

MATERIAL EXAMINED: KENYA: Shimoni, Wasin Id, BMNH 1975.2.12:5, 1(1), 70.7 mm SL (holotype), USNM 21406, 1(1), 63.8 mm SL (paratype). SOUTH AFRICA: Maputoland Reef, 2 km S of Kosi mouth (26°54'S 32°53'E), RUSI 40466, 14(14), 36.0-79.1 mm SL; off Gypsy Hill, Leadmans Shoal, RUSI 16060, 11(11), 23.3-75.0 mm SL (44.2 mm SL specimen subsequently cleared and stained); Sodwana Bay, RUSI 9882, 1(1), 61.9 mm SL, RUSI 10510, 1(1), 33.5 mm SL; Sodwana Bay, Sponge Reef, RUSI 43277, 1(1), 61.7 mm SL; Horns Reef, RUSI 43275, 1(1), 79.3 mm SL; Aliwal Shoal, Hospital Reef, RUSI 44738, 1(1), 72.1 mm SL; Aliwal Shoal, Cathedral, RUSI 40498, 1(1), 63.0 mm SL.

Pseudochromis mooii sp. nov.

Mooi's Dottyback

Figures 30, 52

HOLOTYPE: UF 110839, 49.3 mm SL, Indonesia, Komodo Id, coral reef at Telak Slawi, 0-1.2 m, W. Auffenberg, January 1970.

DIAGNOSIS: A species of *Pseudochromis* with the following combination of characters: segmented dorsal-fin rays 28; segmented anal-fin rays 17; scales in lateral series 46; anterior lateral-line scales 35-37; and no dark grey spot on anterior part of opercle behind upper edge of preopercle.

DESCRIPTION (based on one specimen, 49.3 mm SL): dorsal-fin rays III,28, all segmented rays branched; anal-fin rays III,17,

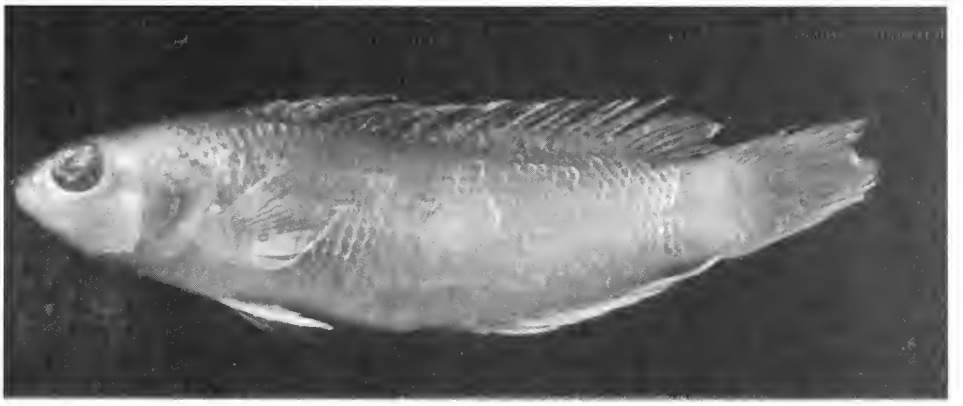

Figure 52. *Pseudochromis mooii*, UF 110839, 49.3 mm SL, holotype, Telak Slawi, Komodo Id, Indonesia. (Photo by P. Hurst)

all segmented rays branched; pectoral-fin rays 18; upper procurrent caudal-fin rays 8; lower procurrent caudal-fin rays 7; total caudal-fin rays 32; scales in lateral series 46; anterior lateral-line scales 35/37; anterior lateral line terminating beneath segmented dorsal-fin ray 21/23; posterior lateral-line scales 11 + ?/9 + ?; scales between lateral lines 4; horizontal scale rows above anal-fin origin 15 + 1 + 3 = 19; circumpeduncular scales 20; predorsal scales 24; scales behind eye 4; scales to preopercular angle 6; gill rakers 5 + 11 = 16; pseudobranch filaments 12; circumorbital pores 47; preopercular pores 22/21; dentary pores 4; posterior interorbital pores 3.

Lower lip incomplete; dorsal and anal fins without distinct scale sheaths, although with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to mid AIO pores; opercle with 4, relatively well-developed serrations; denticles of outer ceratobranchial-1 gill rakers well developed on raker tips only, although with well-developed dneticles running most of length of angle raker; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1 + 1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1; anal-fin spines stout and pungent, the second spine much stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray longest; caudal fin truncate; vertebrae 10 + 16; epineurals 15; epurals 3.

Upper jaw with 3 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 3-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL: head length 23.7; orbit diameter 7.7; snout length 6.1; fleshy interorbital width 4.7; bony interorbital width 3.0; body width 11.2; snout tip to posterior tip of retroarticular bone 14.0; predorsal length 32.3; prepelvic length 30.0; posterior tip of retroarticular bone to pelvic-fin origin 17.4; dorsal-fin origin to pelvic-fin origin 26.4; dorsal-fin origin to middle dorsal-fin ray 32.5; dorsal-fin origin to anal-fin origin 39.8; pelvic-fin origin to anal-fin origin 32.9; middle dorsal-fin ray to dorsal-fin termination 25.8; middle dorsal-fin ray to anal-fin origin 26.4; anal-fin origin to dorsal-fin termination 36.7; anal-fin base length 31.2; dorsal-fin termination to anal-fin termination 15.4; dorsal-fin termination to caudal peduncle dorsal edge 10.5; dorsal-fin termination to caudal peduncle ventral edge 18.3; anal-fin termination to caudal peduncle dorsal edge 19.9; anal-fin termination to caudal peduncle ventral edge 12.4; first dorsal-fin spine 2.4; second dorsal-fin spine 4.7; third dorsal-fin spine 8.1; first segmented dorsal-fin ray 11.4; fourth last segmented dorsal-fin ray 15.0; first anal-fin spine 2.8; second anal-fin spine 7.1; third anal-fin spine broken; first segmented anal-fin ray 9.9; fourth last segmented anal-fin ray 12.6; third pectoral-fin ray 13.6; pelvic-fin spine 10.1; second segmented pelvic-fin ray 17.6; caudal-fin length 23.1.

Live coloration: not known.

Preserved coloration: head and body brown, paler ventrally; dark brown stripe extending from anteroventral edge of eye to upper lip; cheek with two or three indistinct brown oblique stripes; scales of nape and dorsal part of body each with dark brown basal spot; dorsal fin dusky hyaline with about two (anteriorly) to five (posteriorly) rows of elongate dark grey-brown spots, these curving proximally to form broken oblique stripes; anal fin dusky hyaline, becoming hyaline distally, with two to four grey-brown oblique stripes, these more distinct on basal part of fin; caudal fin brown basally becoming dusky hyaline distally, with dorsal and ventral margins broadly pale brown; pectoral fins hyaline; pelvic fins ale brown to hyaline.

HABITAT AND DISTRIBUTION: Known only from the holotype, collected in 0-1.2 m on a coral reef at Telak Slawi, Komodo Id, Indonesia (Figure 30).

COMPARISONS: *Pseudochromis mooii* differs from all other congeners except *P. caudalis* from the central and northwestern Indian Ocean and *P. natalensis* from east Africa in having the following combination of characters: segmented dorsal-fin rays 28; segmented anal-fin rays 17; scales in lateral series 46; and anterior lateral-line scales 35-37. Characters distinguishing *P. mooii* from *P. caudalis* are discussed under *Comparisons* for the latter species. *Pseudochromis mooii* is distinguished from *P. natalensis* in lacking a dark spot on the anterior part of the opercle (versus present in adult specimens

of *P. natalensis*) and in having 24 predorsal scales (versus 16-21 in *P. natalensis*).

REMARKS: Based on similarity in preserved coloration, the live coloration of *P. mooii* probably resembles *P. caudalis* (though differing in lacking the blue-edged black opercular spot).

ETYMOLOGY: The species is named in honour of my good friend and colleague Dr Randall D. Mooi, who has been a constant source of encouragement throughout this study, and who has contributed significantly to our understanding of the systematics and biogeography of perciform fishes.

MATERIAL EXAMINED: See above.

***Pseudochromis moorei* Fowler**
Jaguar Dottyback
Figure 44; Plates 9J, 10A

Pseudochromis (Pseudochromis) moorei Fowler, 1931b: 39, fig. 6 (type locality: Sulade Id, Philippines).
Pseudochromis moorei; Roxas & Martin, 1937: 123 (list); Herre, 1953: 372 (list); Burgess et al., 1988: pl. 152 (colour fig.); Burgess et al., 1991: 203 (colour fig.); Gill & Randall, 1992: 44, figs 6-7 (comparison; distribution; sexual dimorphism; colour figs); Gill, 1993: 50 (colour fig.; sexual dimorphism; habitat and distribution); Allen, 1995: 84, figs 3-4 (comparison; colour figs); Allen, 1997: 96, pl. 29-14 (description; distribution; colour fig.); Randall, 1998: 234, fig. 11 (colour fig.); Gill, 1999b: 2563 (key).

DIAGNOSIS: *Pseudochromis moorei* is distinguished from congeners in having the following character combination: palatine tooth patches inserted medially behind the posterolateral arms of the vomerine tooth patch; large dark grey to black blotch on posterodorsal corner of operculum; and anal fin without dark grey to black (dark grey-brown in preservative) stripe on distal margin.

DESCRIPTION (based on six specimens, 51.0-84.6 mm SL): dorsal-fin rays III,25-26, all or all but first segmented rays branched; anal-fin rays III,13-14, all segmented rays branched; pectoral-fin rays 18; upper procurrent caudal-fin rays 6; lower procurrent caudal-fin rays 5-6; total caudal-fin rays 28-29; scales in lateral series 41-47; anterior lateral-line scales 33-39; anterior lateral line terminating beneath segmented dorsal-fin ray 19-23; posterior lateral-line scales 7-14 + 0-2; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 14-15 + 1 + 3-4 = 18-19; circumpeduncular scales 20; predorsal scales 18-20; scales behind eye 3-4; scales to preopercular angle 7-9; gill rakers 5-6 + 12-13 = 17-18; pseudobranch filaments 13-16; circumorbital pores 24-36; preopercular pores 14-17; dentary pores 4; posterior interorbital pores 1-2.

Lower lip varying from incomplete with weak to moderate symphyseal interruption to complete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to mid AIO pores; opercle with 4-6 large, distinct serrations, sometimes with additional small serration below subopercle junction; teeth of outer ceratobranchial-1 gill rakers well developed mainly on tips only, although sometimes with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1 + 1*/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1 + 1*/1; anal-fin spines stout and pungent, second spine varying from about as stout as third spine to slightly stouter than third spine; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray usually longest, although sometimes subequal to third; caudal fin emarginate to strongly emarginate (almost lunate); vertebrae 10 + 16; epineurals 14-16; epurals 3.

Upper jaw with 2-3 pairs of curved, enlarged caniniform teeth, and 4-5 (at symphysis) to 2-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-3 pairs of curved, caniniform teeth, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-3 irregular rows of small conical teeth arranged in elongate patch, anterior tip of patch directed medially behind posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on five specimens, 51.0-84.6 mm SL): head length 22.1-26.5; orbit diameter 6.5-8.4; snout length 5.5-6.7; fleshy interorbital width 5.5-6.0; bony interorbital width 4.1-4.7; body width 12.6-13.5; snout tip to posterior tip of retroarticular bone 14.3-16.5; predorsal length 30.9-34.7; prepelvic length 31.0-33.3; posterior tip of retroarticular bone to pelvic-fin origin 18.0-21.0; dorsal-fin origin to pelvic-fin origin 28.9-32.0; dorsal-fin origin to middle dorsal-fin ray 34.3-36.0; dorsal-fin origin to anal-fin origin 42.4-46.3; pelvic-fin origin to anal-fin origin 27.4-32.5; middle dorsal-fin ray to dorsal-fin termination 24.7-26.5; middle dorsal-fin ray to anal-fin origin 27.2-28.6; anal-fin origin to dorsal-fin termination 33.8-36.0; anal-fin base length 25.5-28.1; dorsal-fin termination to anal-fin termination 17.0-18.3; dorsal-fin termination to caudal peduncle dorsal edge 11.2-12.8; dorsal-fin termination to caudal peduncle ventral edge 20.4-21.4; anal-fin termination to caudal peduncle dorsal edge 20.8-22.6; anal-fin termination to caudal peduncle ventral edge 11.4-13.6; first dorsal-fin spine 1.3-3.7; second dorsal-fin spine 4.4-6.7; third dorsal-fin spine 5.8-8.6; first segmented dorsal-fin ray 8.7-11.5; fourth last segmented dorsal-fin ray 15.9-17.8; first anal-fin spine 2.1-2.9; second anal-fin spine 4.7-6.7; third anal-fin spine 6.5-8.2; first segmented anal-fin ray 9.6-11.3; fourth last segmented anal-fin ray 15.4-16.7; third pectoral-fin ray 13.7-15.7; pelvic-fin spine 9.2-12.4; second segmented pelvic-fin ray 22.5-24.3; caudal-fin length 20.6-22.1.

Live coloration: Females (based on photographs of specimens from Negros Id, Philippines, field notes taken by R. Lubbock from specimens at Cebu Strait, Philippines, and observations on an aquarium specimen; Plate 9J): head and body dark grey, becoming lighter dorsally, sometimes becoming yellowish grey posteriorly; infraorbitals, corner of mouth, posterior margin of preopercle and posterior margin of operculum dark grey to black; large dark grey to black blotch on posterodorsal corner of operculum; iris yellowish grey to grey, with blue suboval ring around pupil; scales of nape,

dorsoanterior part of body and sometimes upper half of body each with dark brown to black basal spot, these indistinct against dark ground coloration; dorsal and anal fins grey to greyish hyaline, dark grey basally, sometimes with narrow blue distal margins; caudal fin dark greenish yellow to dark basally, becoming grey to greyish hyaline posteriorly, with upper and lower margins broadly dark grey; pectoral fins greyish hyaline; pelvic fins light grey to greyish hyaline. Males (based on photographs of specimens from Negros and Cebu, Philippines, field notes taken by R. Lubbock in the Philippines, and observations on an aquarium specimen; Plate 10A): head and body bright orange-yellow to bright orange, becoming bright reddish orange dorsally and on anterior part of head; dark grey to black head markings as in dark form except not as extensive and more diffuse, becoming brown; dark markings sometimes edged with pale pink tinges; iris bright orange with blue suboval ring around pupil; scales of nape, dorsoanterior part of body and sometimes upper half of body each with dark brown to black basal spot; dorsal and anal fins bright orange becoming orangish hyaline distally with blue distal margin; caudal fin pink to bright orange, becoming pinkish orange to orangish hyaline posteriorly, with dorsal and ventral margins of fin blue; upper and lower part of caudal fin sometimes with narrow to broad submarginal bluish grey to dark grey stripes; pectoral fins pinkish to orangish hyaline; pelvic fins pinkish to orangish hyaline with anterior rays sometimes pale blue to pale grey.

Preserved coloration: Females: pattern similar to live coloration, head and body becoming dark brown; dark markings on head and body remain, becoming dark brown to black; dorsal and anal fins dark brown basally, brownish hyaline distally; caudal fin dark brown; pectoral and pelvic fins brown to brownish hyaline. Males: pattern similar to live coloration, head and body becoming pale yellowish brown; dark markings on head and body remain, becoming dark brown to black; dorsal and anal fins pale brown basally, brownish hyaline to hyaline distally; caudal fin pale brown, dusky brown on dorsal and ventral edges; pectoral and pelvic fins pale brown to brownish hyaline.

HABITAT AND DISTRIBUTION: This species is known on the basis of relatively few specimens from the Philippines (Figure 44). It has also been erroneously recorded from Belau (= Palau) by Gill & Randall (1992) and Allen (1995). The basis for this record is Aoyagi's (1941c) description and figure of *P. olivaceus* from Palau (Belau), which resembles *P. moorei* in having a dark spot on the operculum; however, it is much more likely that Aoyagi's specimen is referable to *P. fuscus* (see *Remarks* for *P. fuscus*). Kuiter (1992) recorded *P. moorei* from Indonesia, but this resulted from confusion with the closely related *P. steenei*. *Pseudochromis moorei* has been observed (based on R. Lubbock's unpublished field notes), and collected from small isolated rock and coral reefs over silty sand and mud bottoms at depths ranging from 20 to 27 m.

COMPARISONS: *Pseudochromis moorei* closely resembles *P. howsoni* from the North West Shelf of Australia, *P. quinquedenatatus* from northern Australia and *P. steenei* from Indonesia in having medially inserted palatine tooth patches and in lacking a dark stripe on the dorsal part of the body. Characters distinguishing the four species are discussed under *Comparisons* for *P. howsoni*.

REMARKS: *Pseudochromis moorei* is a relatively large species; the largest specimen examined measured 84.6 mm SL. The sexual dimorphism noted above was determined from a superficial examination of gonads of available specimens. Furthermore, R. Lubbock (unpublished field notes) and J.E. Randall (pers. comm.) observed pairs of this species in Cebu and Negros, respectively. Colour illustrations of males are provided in Burgess et al. (1988; 1991), Gill & Randall (1992: fig. 6), Gill (1993), Allen (1995: fig. 3), and Randall (1998), and Gill & Randall (1992: fig. 7) and Allen (1995: fig. 4) provide illustrations of females.

ETYMOLOGY: The specific epithet is for Dr J. Percy Moore, formerly of the University of Pennsylvania.

MATERIAL EXAMINED: No locality (aquarium trade specimen), BMNH 2000.5.16.2, 72.0 mm SL. PHILIPPINES: Negros, Dumaguete, off South Sea Resort Hotel, BPBM 28606, 2(2), 70.5-84.6 mm SL; Mindanao, Gulf of Davao, Linao Point, USNM 144576, 1(1), 50.8 mm SL (paratype); Sulu Archipelago, Sulade Id, USNM 89993, 1(1), 79.0 mm SL (holotype); Sulu Archipelago, Tawitawi Group, Observation Id, USNM 144577, 1(1), 51.0 mm SL (paratype).

***Pseudochromis natalensis* Regan**

Natal Dottyback

Figure 33; Plate 10B

Pseudochromis natalensis Regan, 1916: 167 (type locality: Durban, South Africa); Lubbock, 1977: 10, pls 1e and 3f (Kenya, Mozambique, South Africa and Madagascar); Smith, 1980: 176 (Maputaland, South Africa); Smith, 1986: 540, pl. 46.

Pseudochromis (Devisina) natalensis; Fowler, 1931b: 33 (compilation).

DIAGNOSIS: *Pseudochromis natalensis* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 26-28, usually 27; segmented anal-fin rays 16-18, usually 17; scales in lateral series 41-50, usually 44-46; anterior lateral-line scales 34-41; dentary pores 4-5, rarely 5; circumpeduncular scales 19-22; predorsal scales 16-21; and opercular flap without dark spot.

DESCRIPTION (based on 45 specimens, 33.4-71.4 mm SL): dorsal-fin rays 26-28, all or all but first segmented rays branched; anal-fin rays III,16-18, all segmented rays branched; pectoral-fin rays 17-19; upper procurrent caudal-fin rays 6-8; lower procurrent caudal-fin rays 5-7; total caudal-fin rays 29-32; scales in lateral series 41-50; anterior lateral-line scales 34-41; anterior lateral line terminating beneath segmented dorsal-fin ray 19-23; posterior lateral-line scales 5-12 + 0-3; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 13-16 + 1 + 3-4 = 17-20; circumpeduncular scales 19-22; predorsal scales 16-21; scales behind eye 2-4; scales to preopercular angle 4-7; gill rakers 3-6 + 10-12 = 13-16; pseudobranch filaments 9-13; circumorbital pores 29-83;

preopercular pores 16-39; dentary pores 4-5; posterior interorbital pores 1-5.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from posterior AIO to mid AIO pores; opercle with 3-5 usually relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed on raker tips only, although sometimes with small teeth running most of raker lengths; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1 + 1*/1/1 or S/S/S + 3/1 + 1/1/1/1/1/1 + 1*/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1*/1 + 1*, 3/1 + 1/1 + 1/1/1 or 3/1/1 + 1/1 + 1/1; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine stout and pungent; second or third segmented pelvic-fin ray longest; caudal fin rounded to truncate or emarginate; vertebrae 10 + 16; epineurals 14-17; epurals 3.

Upper jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 5-7 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 3-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 13 specimens, 33.4-71.4 mm SL): head length 21.1-26.0; orbit diameter 7.0-10.5; snout length 5.0-6.5; fleshy interorbital width 4.2-5.3; bony interorbital width 2.7-3.2; body width 10.7-12.6; snout tip to posterior tip of retroarticular bone 11.5-14.4; predorsal length 28.9-34.5; prepelvic length 29.3-32.7; posterior tip of retroarticular bone to pelvic-fin origin 18.2-20.4; dorsal-fin origin to pelvic-fin origin 24.7-27.0; dorsal-fin origin to middle dorsal-fin ray 32.6-35.2; dorsal-fin origin to anal-fin origin 36.7-41.7; pelvic-fin origin to anal-fin origin 28.1-33.7; middle dorsal-fin ray to dorsal-fin termination 24.3-27.7; middle dorsal-fin ray to anal-fin origin 24.5-27.1; anal-fin origin to dorsal-fin termination 34.2-38.3; anal-fin base length 27.4-31.6; dorsal-fin termination to anal-fin termination 14.4-16.8; dorsal-fin termination to caudal peduncle dorsal edge 10.2-12.4; dorsal-fin termination to caudal peduncle ventral edge 18.2-20.3; anal-fin termination to caudal peduncle dorsal edge 18.6-21.5; anal-fin termination to caudal peduncle ventral edge 10.1-12.8; first dorsal-fin spine 1.4-2.7; second dorsal-fin spine 3.9-6.0; third dorsal-fin spine 6.8-9.0; first segmented dorsal-fin ray 9.9-12.3; fourth last segmented dorsal-fin ray 14.4-17.1; first anal-fin spine 1.5-2.8; second anal-fin spine 4.7-6.6; third anal-fin spine 4.9-6.3; first segmented anal-fin ray 8.3-9.9; fourth last segmented anal-fin ray 11.2-14.2; third pectoral-fin ray 13.1-14.6; pelvic-fin spine 7.1-10.1; second segmented pelvic-fin ray 14.7-20.0; caudal-fin length 22.3-24.8.

Live coloration (based on colour photographs of specimens from Aliwal Shoal and Landers Reef, South Africa; Plate 10B): head and body grey-brown, paler ventrally, becoming orangish brown on ventral part of head; dark bluish grey to black spot at anterodorsal corner of opercle, just behind dorsal tip of preopercle; short dark bluish grey bar on posterodorsal rim of orbit; irregular bluish grey to mauve spots and bars on lower part of head, forming a series of short curved bars on cheek; iris yellow to bright red, grey on edges, with blue suboval ring around pupil; scales of nape and upper part of flanks each with dark buish grey basal spot; edges of scales on remainder of body yellowish brown to red, this most distinct on caudal peduncle; basal third of dorsal fin yellowish brown to bright yellow, remainder of fin pinkish to yellowish hyaline; one or two rows of dark bluish grey to blue spots on yellowish brown to bright yellow portion of fin, remainder of fin marked with diffuse bluish grey spots and stripes; anal fin brown to brownish hyaline, with several rows of small yellow spots, these most intense on basal part of fin; caudal fin yellowish to orangish brown, becoming bright yellow to pale grey posteriorly; two short greyish yellow to dark grey stripes on caudal fin, one from dorsal and other from ventral edge of caudal fin to middle of upper and lower rays, respectively, area outside stipes pale grey to bright yellow; pectoral fins brownish hyaline, with upper part of fin base dusky grey; pelvic fins pale yellow to pale grey.

Preserved coloration: pattern similar to live coloration, head and body becoming brown, paler ventrally; dark bluish grey to black spot at anterodorsal corner of opercle becoming dark brown to dark grey-brown, but absent in small specimens; posterodorsal rim of orbit dark brown to dark grey-brown; short dark brown to dark grey-brown stripe from anterior edge of eye to middle of upper lip; dark buish grey basal spots on upper flanks becoming dark brown to dark grey-brown; dorsal and anal fins pale brown to brownish hyaline, either darker or paler basally, with series of brown to grey-brown spots; caudal fin brown basally, becoming pale brown to brownish hyaline posteriorly, dorsally and ventrally; dark stripes on caudal fin remain, although usually indistinct on small specimens, becoming greyish brown; pectoral fins brownish hyaline to hyaline; pelvic fins pale brown to brownish hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis natalensis* is known only from the east coast of Africa, from Tecomaji Id, Mozambique, to Umkomaas, South Africa (Figure 33). Records from Madagascar, Tanzania and Kenya have resulted from confusion with *P. kristinae* and *P. madagascariensis*. It has been collected from around coral and rock reef and boulders in 20-42 m.

COMPARISONS: *Pseudochromis natalensis* closely resembles, and has been confused variously with, *P. kristinae, P. madagascariensis* and *P. tauberae*. Characters distinguishing the four species are discussed under *Comparisons* for *P. kristinae*. It also closely resembles *P. caudalis* and *P. mooii* in general morphology; characters distinguishing it from those species are given under *Comparisons* for *P. caudalis* and *P. mooii*.

REMARKS: *Pseudochromis natalensis* is a moderately large species; the largest specimen examined measured 75.9 mm SL.

ETYMOLOGY: The specific epithet refers to the type locality.

MATERIAL EXAMINED: MOZAMBIQUE: Tecomaji Id, RUSI 48826 [in part; tag "Tekomajo Is"], 1(1), 44.0 mm SL; Kifuki Id, RUSI 3606, 3(3), 66.4-75.9 mm SL; Bazaruto Id, RUSI 48826 [in part; tag "Bazaruto"], 1(1), 54.0 mm SL; Inhaca Id, RUSI 48826 [in part; tag "Inhaca"], 1(1), 36.5 mm SL. NATAL, SOUTH AFRICA: Leadmans Shoal, RUSI 16045, 1(1), 36.5 mm SL; Durban, BMNH 1915.7.6:5, 1(1), 71.4 mm SL (holotype), RUSI 3630, 1(1), 52.7 mm SL; Park Rynie, Landers Reef, RUSI 40410, 11(11), 42.5-57.8 mm SL; Park Rynie, RUSI 40246, 17(17), 40.8-66.1 mm SL (63.3 mm SL specimen subsequently cleared and stained); off Umkomaas, Aliwal Shoal, RUSI 40527, 8(8), 33.4-66.8 mm SL; off Umkomaas, Aliwal Shoal, Clives Reef, RUSI 44743, 1(0), 64.5 mm SL.

Pseudochromis nigrovittatus Boulenger

Black-striped Dottyback

Figure 47; Plates 10C-D

Pseudochromis nigrovittatus Boulenger, 1897: 421 (Mekran Coast, Persia); Regan, 1905: 330 (list); Lubbock, 1975: 141, pl. 4 (description; lectotype designation; Makran Coast, Persian Gulf and Oman); Relyea, 1981: 66; Gill & Mee, 1993: 56, figs 6-7 (habitat and distribution; colour figs); Debelius, 1993: 114 (habitat and distribution; colour fig.); Gill & Randall, 1994: 16 (key); Randall, 1994: 272 (Seven Brothers Ids, northwestern Gulf of Aden); Randall, 1995: 142, fig. 336 (description; distribution; colour fig.); Debelius, 1996: 114 (colour fig.); Carpenter et al., 1997: 147 (description; habitat notes; fig.); Debelius, 1998: 70 (colour figs; habitat and distribution).

Pseudochromis (Pseudochromis) nigrovittatus; Fowler, 1931b: 36 (compilation).

DIAGNOSIS: *Pseudochromis nigrovittatus* differs from congeners in having the following characters in combination: segmented dorsal-fin rays 26-28 (usually 27); segmented anal-fin rays 15-17 (rarely 15); dorsal-fin origin to pelvic-fin origin 21.5-26.5 % SL; large black (dark blue to black in life) spot on opercular flap; and small scattered dark brown to black (dark blue in life) spots present on sides of body.

DESCRIPTION (based on 28 specimens, 24.5-65.9 mm SL): dorsal-fin rays III,26-28, last 7-20 segmented rays branched; anal-fin rays III,15-17, last 13-17 segmented rays branched; pectoral-fin rays 16-19; upper procurrent caudal-fin rays 6-8; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 30-32; scales in lateral series 41-49; anterior lateral-line scales 32-40; anterior lateral line terminating beneath segmented dorsal-fin ray 17-22; posterior lateral-line scales 5-13 + 0-3; scales between lateral lines 4-5; horizontal scale rows above anal-fin origin 13-16 + 1 + 2-4 = 17-20; circumpeduncular scales 20-21; predorsal scales 12-28; scales behind eye 3-4; scales to preopercular angle 5-7; gill rakers 4-5 + 10-11 = 14-16; pseudobranch filaments 7-12; circumorbital pores 19-38; preopercular pores 11-20; dentary pores 4; posterior interorbital pores 1-4.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although intermittent scales sometimes overlap fin bases; predorsal scales extending anteriorly to point ranging from slightly behind PIO pores to mid AIO pores; opercle with 2-6, usually bluntly rounded serrations; teeth of outer ceratobranchial-1 gill rakers usually well-developed on distal halves or tips of rakers only; anterior dorsal-fin pterygiophore formula S*/S/S + 3/I + I/I/1/1/1 + 1*/I; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/I/1 + 1*/1; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray usually longest, although third ray sometimes subequal to second; caudal fin either emarginate or rounded with posterior margin truncate; vertebrae 10 + 16; epineurals 16-17; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 5-7 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 3-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 18 specimens, 24.5-65.9 mm SL): head length 21.2-27.3; orbit diameter 5.9-9.8; snout length 4.9-5.7; fleshy interorbital width 4.3-5.7; bony interorbital width 2.5-3.7; body width 8.8-11.7; snout tip to posterior tip of retroarticular bone 11.8-14.0; predorsal length 27.6-33.9; prepelvic length 28.0-32.7; posterior tip of retroarticular bone to pelvic-fin origin 17.2-20.7; dorsal-fin origin to pelvic-fin origin 21.5-26.5; dorsal-fin origin to middle dorsal-fin ray 30.6-38.3; dorsal-fin origin to anal-fin origin 37.2-40.4; pelvic-fin origin to anal-fin origin 21.1-31.0; middle dorsal-fin ray to dorsal-fin termination 23.7-29.1; middle dorsal-fin ray to anal-fin origin 19.5-24.7; anal-fin origin to dorsal-fin termination 32.3-37.3; anal-fin base length 27.7-33.2; dorsal-fin termination to anal-fin termination 12.2-14.7; dorsal-fin termination to caudal peduncle dorsal edge 9.0-12.3; dorsal-fin termination to caudal peduncle ventral edge 15.6-19.0; anal-fin termination to caudal peduncle dorsal edge 17.1-20.0; anal-fin termination to caudal peduncle ventral edge 10.5-13.7; first dorsal-fin spine 1.7-2.9; second dorsal-fin spine 4.0-7.3; third dorsal-fin spine 6.8-10.6; first segmented dorsal-fin ray 10.3-15.7; fourth last segmented dorsal-fin ray 14.3-17.2; first anal-fin spine 2.0-2.9; second anal-fin spine 4.7-8.4; third anal-fin spine 5.5-7.8; first segmented anal-fin ray 8.9-11.4; fourth last segmented anal-fin ray 12.4-16.1; third pectoral-fin ray 12.1-15.1; pelvic-fin spine 7.0-10.5; second segmented pelvic-fin ray 14.1-19.6; caudal-fin length 22.6-25.2.

Live coloration: Non-striped form (based on a photograph of a specimen from Salalah, Oman; Plate 10C): head and body dark greyish brown, becoming pale pinkish brown ventrally on abdomen and yellow on posterior part of caudal peduncle; head below level of eye orange with scattered pale blue spots; large dark blue spot on opercular flap, spot bordered posteriorly with gold; iris orange to brown with blue suboval ring around pupil; body and upper part of operculum with scattered dark blue spots; basal two-thirds of dorsal fin pinkish grey with

scattered small dark blue spots, remainder of fin bright red with bright blue distal margin; anal fin pinkish grey basally, becoming pinkish hyaline distally, with scattered small blue spots and bright blue distal margin; caudal fin bright yellow, becoming yellowish hyaline posteriorly, with upper and lower edges of fin mauve; pectoral and pelvic fins pinkish hyaline. Striped form (based on a photograph of a specimen from Oman; Plate 10D): head and body with broad dark greyish brown to black stripe extending from snout tip through eye and upper edge of operculum to midbase of caudal fin, edges of stripe becoming pinkish brown; area of head and body above dark stripe yellowish brown; area below stripe pale pink to cream; large dark blue to black spot on opercular flap, spot bordered posteriorly with gold; iris orangish brown with blue suboval ring around pupil; sides of body within and immediately above and below dark stripe with scattered dark blue spots; dorsal and anal fins pale yellow to yellowish hyaline; caudal fin pale yellow to yellowish hyaline with broad greyish brown to black stripe from body extending onto basal halves of middle caudal rays, stripe narrowing posteriorly to pointed tip; pectoral and pelvic fins pinkish to yellowish hyaline.

Preserved coloration: head and body pale yellowish brown or reddish brown to greyish brown, paler ventrally; dark brown to dark grey stripe (often diffuse or absent) extending from snout tip through eye to upper edge of operculum, then continuing along side of body to midbase of caudal fin; large black spot on opercular flap; sides of body with small scattered dark brown to black spots; dorsal fin pale brown to brownish hyaline with indistinct brown submarginal stripe on distal third of fin; anal fin pale brown to brownish hyaline, dusky distally; caudal fin pale brown to brownish hyaline with dark body stripe (if present) extending onto fin to area ranging from middle to tips of central rays, stripe becoming dusky to dark brown; pectoral fins hyaline; pelvic fins pale brown to brownish hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis nigrovittatus* was previously known only from the northwestern Indian Ocean, from the Makran Coast and the Strait of Hormuz south to the Gulf of Tadjoura in the western Gulf of Aden (Gill & Mee, 1993). Its range is extended south to Socotra, and along the northern coast of the Gulf of Aden (Bir Ali and Al Mukalla) to Kamaran Id, southern Red Sea, based on photographs and sight records by J. Kemp (Figure 47). It also occurs in the Persian Gulf based on two specimens without specific locality data in The Natural History Museum, London. It has been collected and observed (J. Kemp, pers. comm.) from tidal pools, around boulders, in rock crevices, and around rock and coral reefs at depths ranging to 12 m. According to field notes accompanying museum specimens, this species sometimes shelters among the spines of *Diadema* sea urchins.

COMPARISONS: *Pseudochromis nigrovittatus* is relatively distinctive and unlikely to be confused with other species. The following character combination distinguishes it from all other pseudochromines: segmented dorsal-fin rays 26-28 (usually 27); segmented anal-fin rays 15-17 (usually 16-17); body depth relatively shallow (dorsal-fin origin to pelvic-fin origin 21.5-26.5 % SL); large black (dark blue to black in life) spot on opercular flap; and sides of body with scattered small dark brown to black (dark blue in life) spots. When present, the dark stripe on the sides of the head and body in combination with the black opercular spot further distinguishes the species.

REMARKS: *Pseudochromis nigrovittatus* is a moderate-sized species; the largest specimen examined measured 65.9 mm SL. Live colour illustrations of the two colour forms of the species are given in Gill & Mee (1993) and Debelius (1993, 1996, 1998), and Randall (1995) provided a photograph of a striped specimen. The non-striped and striped forms are neither associated with size nor sex. In addition, a relatively large number of specimens had colourations intermediate between the two forms, suggesting that the colourations may be relatively labile. It is interesting to note that several of the striped specimens examined in this study were seen hiding among the spines of *Diadema* sea urchins. Possibly stripe expression is associated with the use of this refuge. Gill & Mee (1993: 56) noted that the striped form of the species bears a striking resemblance to the "horizontally bicoloured" form (Springer, 1988: 31, pl. 2, fig. 2) of the salariin blenniid *Ecsenius pulcher* (Murray), which occurs sympatrically with *P. nigrovittatus*, and suggested that the two species might be involved in a mimetic association. *Pseudochromis persicus* also has a striped colour form that resembles *E. pulcher* and was also suggested by Gill & Mee to be possibly involved in a mimetic association with that species; further discussion is given under *Remarks* for *P. persicus*.

ETYMOLOGY: The specific epithet is derived from the Latin *niger*, black, and *vitta*, ribbon, with reference to the dark body stripe.

MATERIAL EXAMINED: PERSIAN GULF: BMNH 1900.5.9:35-36, 2(0), 51.1-54.2 mm SL. IRAN (PERSIA): Makran (Mekran) Coast, BMNH 1897.9.22:2, 1(1), 62.1 mm SL (lectotype), BMNH 1897.9.22:3, 1(1), 43.0 mm SL (paralectotype). OMAN: Strait of Hormuz, Al Khasab, BMNH 1973.12.20:100-102, 3(0), 34.4-48.4 mm SL, BMNH 1984.5.16:121, 1(0); Gulf of Oman, Bandar Sidb, BPBM 21436, 2(0), 40.0-42.0 mm SL; Gulf of Oman, Kalhat, ROM 40041, 5(2, 22.1-49.5 mm SL, cleared and stained), 16.4-49.5 mm SL, ROM 40042, 3(3), 30.8-49.8 mm SL; Gulf of Oman, Masqat area, USNM 324636, 1(0), 48.0 mm SL, USNM 324637, 1(0), 54.5 mm SL; Gulf of Oman, Sur vicinity, ROM 40028, 9(9), 37.8-63.0 mm SL, ROM 40029, 2(2), 48.4-52.0 mm SL, ROM 40030, 4(4), 32.6-47.2 mm SL, ROM 40031, 1(1), 60.0 mm SL, ROM 40034, 2(2), 38.2-52.5 mm SL, ROM 40040, 2(2), 57.5-65.9 mm SL, ROM 40074, 1(1), 24.5 mm SL; Gulf of Oman, E of Wadi Bir Bira, ROM 40038, 1(1), 40.6 mm SL. DJIBOUTI, GULF OF ADEN: Gulf of Tadjoura, Sawabi Ids, Tolka Id (Ile Basse), BPBM 35013, 1(1), 29.3 mm SL.

***Pseudochromis olivaceus* Rüppell**

Olive Dottyback

Figures 48-49; Plate 10E

Pseudochromis olivaceus Rüppell, 1835: 8, pl. 2, fig. 3 (type locality: Red Sea); Günther, 1860: 257 (compilation); Marshall, 1952: 229 (Gulf of Aqaba; Sanafir Id); Kotthaus, 1970: 51, figs 223-224 (description; Farasan Ids, Red Sea);

Botros, 1971: 259 (habits; specific epithet misspelt *olivaceous*), 315 (list); Lubbock, 1975: 131, pl. 1b (description and distribution in part, Red Sea localities only; lectotype designation); Randall, 1983: 59 (in part, Red Sea distribution only; description and colour figs); Ben-Tuvia et al., 1983: 197 (list; habitat); Dor, 1984: 106 (list; synonymy in part, Red Sea references only); Debelius, 1987: 46 (colour fig.); Burgess et al., 1988: pl. 154 (colour fig.); Randall & Stanaland, 1989: 108, fig. 5 (comparison; colour fig.); Aramata, 1990: 90 (after Rüppell, 1835); Baensch & Debelius, 1992: 977 (colour fig.); Goren & Dor, 1994: 28 (list); Lieske & Myers, 1994: pl. 31, fig. 9 (colour fig.; habitat and distribution); Field & Field, 1998: 78 (colour figs; not distribution); Debelius, 1998: 69 (colour figs; habitat and distribution).

Pseudochromis (Pseudochromis) olivaceus; Fowler, 1931b: 37 (compilation).

DIAGNOSIS: *Pseudochromis olivaceus* is distinguished from congeners in having the following character combination: opercular flap with large dark grey to black (dark blue in life) spot; predorsal scales 27-40; dorsal-fin origin to pelvic-fin origin 30.7-34.1 % SL; and sides of body with several to many dark grey to black (dark blue in life) crescentic marks.

DESCRIPTION (based on 55 specimens, 25.2-64.4 mm SL): dorsal-fin rays III,26-28, last 8-23 segmented rays branched; anal-fin rays III,14-16, all or all but first 1-3 segmented rays branched; pectoral-fin rays 17-19; upper procurrent caudal-fin rays 6-8; lower procurrent caudal rays 6-8; total caudal-fin rays 29-32; scales in lateral series 39-47; anterior lateral-line scales 28-37; anterior lateral line terminating beneath segmented dorsal-fin ray 16-23; posterior lateral-line scales 5-15 + 0-3; scales between lateral lines 4-6; horizontal scale rows above anal-fin origin 15-19 + 1 + 3-7 = 20-27; circumpeduncular scales 19-23; predorsal scales 27-40; scales behind eye 3-5; scales to preopercular angle 6-9; gill rakers 4-8 + 11-13 = 15-21; pseudobranch filaments 7-14; circumorbital pores 18-36; preopercular pores 9-20; dentary pores 4-5; posterior interorbital pores 1-3.

Lower lip incomplete; dorsal and anal fins usually without distinct scale sheaths, although weak scale sheaths sometimes present posteriorly in large specimens; predorsal scales extending anteriorly to point ranging from vicinity of posterior AIO pores to posterior nasal pores; opercle with 3-7 usually relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed on distal halves or tips of rakers only, although often with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1 + 1*/1/1/1/1 + 1*/1; dorsal-fin spines moderately slender and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1 + 1*/1 + 1*; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine moderately slender to stout and pungent; second or third segmented pelvic-fin ray longest; caudal fin usually weakly to strongly emarginate,.but often rounded or rounded with truncate posterior margin; vertebrae 10 + 16; epineurals 13-15; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-3 rows of small conical teeth, forming chevron; palatine with 2-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate or with 1 row of small conical teeth anteriorly; tongue moderately pointed and edentate.

As percentage of SL (based on 26 specimens, 25.2-53.0 mm SL): head length 24.0-30.6; orbit diameter 7.7-12.3; snout length 6.0-7.8; fleshy interorbital width 5.6-6.8; bony interorbital width 3.4-4.7; body width 12.1-14.7; snout tip to posterior tip of retroarticular bone 13.2-17.1; predorsal length 30.6-37.2; prepelvic length 30.8-37.2; posterior tip of retroarticular bone to pelvic-fin origin 18.7-21.3; dorsal-fin origin to pelvic-fin origin 30.7-34.1; dorsal-fin origin to middle dorsal-fin ray 33.0-38.8; dorsal-fin origin to anal-fin origin 41.6-46.6; pelvic-fin origin to anal-fin origin 22.9-28.6; middle dorsal-fin ray to dorsal-fin termination 24.0-28.2; middle dorsal-fin ray to anal-fin origin 28.3-34.7; anal-fin origin to dorsal-fin termination 36.1-40.8; anal-fin base length 26.5-33.0; dorsal-fin termination to anal-fin termination 16.1-17.7; dorsal-fin termination to caudal peduncle dorsal edge 9.4-11.9; dorsal-fin termination to caudal peduncle ventral edge 18.7-20.9; anal-fin termination to caudal peduncle dorsal edge 19.5-22.5; anal-fin termination to caudal peduncle ventral edge 10.6-13.3; first dorsal-fin spine 2.1-4.4; second dorsal-fin spine 5.0-7.4; third dorsal-fin spine 7.6-10.2; first segmented dorsal-fin ray 13.2-19.2; fourth last segmented dorsal-fin ray 17.9-31.1; first anal-fin spine 2.0-4.2; second anal-fin spine 5.8-9.7; third anal-fin spine 6.0-9.1; first segmented anal-fin ray 11.2-14.0; fourth last segmented anal-fin ray 16.3-23.8; third pectoral-fin ray 14.9-17.5; pelvic-fin spine 8.9-13.2; second segmented pelvic-fin ray 21.5-32.5; caudal-fin length 24.3-31.1.

Live coloration (based on photographs of specimens from Sudan, Jiddah and the Gulf of Aqaba; Plate 10E): head and body dark olive to dark grey (almost black), usually becoming yellowish olive ventrally on head and breast and sometimes on posterior part of caudal peduncle; large dark blue spot on opercular flap, this edged with gold to red; dark grey line extending around posteroventral rim of orbit to upper lip, then ascending along anterior edge of first interorbital bone; iris dark grey or olive to bright red with dark blue suboval ring around pupil; several to many scales on flanks each with dark blue crescent-shaped mark; dorsal fin olive to almost black, darker basally, with red distal margin, this sometimes edged in bright blue; anal fin yellowish brown to olive or dark grey, usually darker basally; caudal fin yellowish brown to olive or dark grey, darker basally, sometimes edged dorsally, ventrally and occasionally posteriorly with yellow to bright red, yellow to bright red edges sometimes with dusky grey to bright blue distal margin; pectoral fins pinkish, greyish or yellowish hyaline to hyaline; pelvic fins yellowish brown or hyaline to dark grey.

Preserved coloration: pattern similar to live coloration, head and body becoming yellowish brown to brown, paler ventrally; dark blue opercular flap and crescent-shaped marks becoming dark grey to black; dorsal and anal fins becoming brown to

dark brown, usually darker than body; caudal fin brown basally becoming paler posteriorly; pectoral fins hyaline; pelvic fins whitish brown to brown or hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis olivaceus* is known only from the Red Sea, from the Gulfs of Suez and Aqaba south to the Kamaran Ids and the vicinity of Massawa (Figure 48). Records of this species from Djibouti, the Gulf of Aden, Gulf of Oman, Persian Gulf and Pakistan are based on the closely related *P. linda*, and Aoyagi's (1941a, 1941c) records from the Palau Ids (Belau) are based on *P. fuscus*. *Pseudochromis olivaceus* has been observed (e.g., Lubbock, 1975: 132; pers. obs.) and collected from a variety of reef habitats, but is mainly associated with branching and leaf corals, such as *Montipora, Pocillopora, Stylophora, Acropora* and *Seriatopora*, and fire corals (Botros, 1971: 259; Lubbock, 1975: 132; pers. obs.). It has been collected at depths ranging to 40 m, but appears to be more abundant in the shallower parts of this range.

COMPARISONS: *Pseudochromis olivaceus* closely resembles and has been previously confused with *P. linda*. Characters distinguishing these two species are discussed under *Comparisons* for *P. linda*. It is distinguished from all other pseudochromines in having the following character combination: large dark grey to black (dark blue in life) spot on opercular flap; predorsal scales 27-40; and dorsal-fin origin to pelvic-fin origin 30.7-34.1 % SL.

REMARKS: *Pseudochromis olivaceus* is a moderately large species; the largest specimen examined measured 69.0 mm SL. However, a 34.5 mm SL specimen from the Kamaran Ids (SMF 28868) was a gravid female. It has been illustrated in colour by, for example, Lubbock (1975), Randall (1983), Debelius (1987, 1998), Burgess et al. (1988), Randall & Stanaland (1989), Baensch & Debelius (1992) and Field & Field (1998).

ETYMOLOGY: The specific epithet is from the Latin for olive and refers to the live coloration.

MATERIAL EXAMINED (all Red Sea): RED SEA: SMF 436, 1(1), 55.4 mm SL (lectotype), SMF 9504-9506, 3(1, 64.4 mm SL), 45.0-64.4 mm SL (paralectotypes). GULF OF SUEZ: BMNH 1869.6.21:19, 1(0), 56.0 mm SL; El Tfr, USNM 211768, 10(0), 23.8-55.4 mm SL. GULF OF AQABA: Khor Inkeifail, BMNH 1960.3.15:254-266, 13(13), 32.2-50.2 mm SL; bay between Marsa Morkrahk and El Himira, USNM 211769, 54(17, 34.8-53.0 mm SL; 2 specimens, 43.0-46.3 mm SL, cleared and stained), 11.6-53.0 mm SL; El Himira, USNM 290576, 13(0); Dahab, USNM 203661, 16(0); Nabq, ROM 43609, 7(7), 29.5-40.7 mm SL. SINAI PENINSULA: Strait of Jubal, USNM 290450, 1(0); Ras Muhammad, USNM 290510, 16(0); Sinafir (Sanafir) Id, BMNH 1951.11.6:196-203, 35(0), 24.7-69.0 mm SL. EGYPT: Hurghada, BMNH 1935.9.30:19, 1(0), 39.5 mm SL; bay on NW end of Gifatin Id, USNM 290521, 18(0); 5 km N of Quseir, USNM 290632, 3(0). SUDAN: Sanganeb Reef, SMF 12663, 12(0); Port Sudan, BMNH 1973.12.20:58-59, 2(0), 27.5-33.8 mm SL; Suakin, BMNH 1973.12.20:63, 1(0), 42.5 mm SL. ERITREA: USNM 258786, 1(1), 38.5 mm SL; Dahlak Archipelago, off S end of Harat Id, USNM 211766, 15(15), 25.2-52.0 mm SL; Melita Bay, USNM 290568, 1(0). SAUDI ARABIA: Jiddah, BMNH 1973.12.20:57, 1(0), 50.0 mm SL, USNM 147528, 3(0), 50.5-54.6 mm SL; Farasan Ids, Farasan Id, SMF 12661, 2(0), SMF 12662, 2(2), 41.2-43.4 mm SL. YEMEN: Kamaran Ids, Kadaman Id, SMF 28867, 3(0), 36.0-39.5 mm SL, SMF 28868, 4(0), 34.5-46.0 mm SL; Uqban Id, SMF 28872, 1(0), 52.2 mm SL, SMF 28876, 2(0), 34.5-37.2 mm SL.

Pseudochromis omanensis Gill & Mee
Omani Dottyback
Figure 53; Plates 10F-H

Pseudochromis omanensis Gill & Mee, 1993: 57, fig. 8 (type locality: Barr al Hikman, Oman); Gill & Randall, 1994: 16 (key); Randall & Hoover, 1995: 686 (listed in discussion of endemism of southern and central Oman fishes); Randall, 1995: 142, figs 330A, 337-338 (description; distribution; colour figs); Debelius, 1998: 71 (colour figs; habitat and distribution).

DIAGNOSIS: *Pseudochromis omanensis* is distinguished from congeners in having the following character combination: dorsal-fin rays III,29-31; scales in lateral series 54-67; scales between lateral lines 3; circumpeduncular scales 20-22, usually 20; and, when preserved, body without scattered dark grey to black punctate spots.

DESCRIPTION (based on 14 specimens, 41.1-97.0 mm SL): dorsal-fin rays III,29-31, all or all but first 1-2 segmented rays branched; anal rays III,19-20, all or all but first segmented rays branched; pectoral rays 18-20; upper procurrent caudal rays 8-9; lower procurrent caudal rays 6-8; total caudal-fin rays 31-34; scales in lateral series 54-67; anterior lateral-line scales 49-60; anterior lateral line terminating beneath segmented dorsal-fin ray 24-28; posterior lateral-line scales 5-14 + 1-2; scales between lateral lines 3; horizontal scale rows above anal-fin origin 15-18 + 1 + 2-4 = 19-22; circumpeduncular scales 20-22; predorsal scales 22-28; scales behind eye 3-4; scales to preopercular angle 5-8; gill rakers 4-5 + 10-11 = 14-16; pseudobranch filaments 10-15; circumorbital pores 38-128; preopercular pores 20-46; dentary pores 4-7; posterior interorbital pores 1-12.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from mid AIO pores to anterior AIO pores; opercle with 3-7 relatively strong serrations; well-developed teeth of outer ceratobranchial-1 gill rakers running most of length of upper rakers, tending to becoming confined to distal halves of lower rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1 + 1*/1/1 + 1* or S/S/S + 3/1 + 1/1/1/1/1/1 + 1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1 + 1/1 + 1*/1 + 1*; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine stout and pungent; second or third segmented pelvic-fin ray longest; caudal fin rounded to truncate, with upper and sometimes lower lobes slightly produced; vertebrae 10 + 16; epineurals 15-18; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical

teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, conical teeth becoming larger and more curved on middle of jaw; vomer with 1-2 rows of small conical teeth, forming chevron; palatines with 2-3 rows of small conical teeth arranged inelongate patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL: head length 20.2-25.0; orbit diameter 6.0-8.5; snout length 4.8-5.7; fleshy interorbital width 3.7-4.7; bony interorbital width 2.4-3.0; body width 9.2-11.5; snout tip to posterior tip of retroarticular bone 11.4-13.3; predorsal length 25.9-31.6; prepelvic length 26.4-30.5; posterior tip of retroarticular bone to pelvic-fin origin 16.2-19.2; dorsal-fin origin to pelvic-fin origin 24.1-27.7; dorsal-fin origin to middle dorsal-fin ray 35.2-41.2; dorsal-fin origin to anal-fin origin 36.0-42.1; pelvic-fin origin to anal-fin origin 22.3-31.6; middle dorsal-fin ray to dorsal-fin termination 26.0-30.6; middle dorsal-fin ray to anal-fin origin 21.9-24.9; anal-fin origin to dorsal-fin termination 35.4-42.1; anal-fin base length 29.1-36.8; dorsal-fin termination to anal-fin termination 12.2-14.2; dorsal-fin termination to caudal peduncle dorsal edge 9.2-11.7; dorsal-fin termination to caudal peduncle ventral edge 15.5-17.3; anal-fin termination to caudal peduncle dorsal edge 16.3-18.8; anal-fin termination to caudal peduncle ventral edge 9.8-11.9; first dorsal-fin spine 2.0-3.5; second dorsal-fin spine 3.6-6.1; third dorsal-fin spine 5.9-8.1; first segmented dorsal-fin ray 8.4-11.4; fourth last segmented dorsal-fin ray 11.3-20.1; first anal-fin spine 2.0-3.4; second anal-fin spine 4.0-8.2; third anal-fin spine 4.6-7.3; first segmented anal-fin ray 7.8-9.7; fourth last segmented anal-fin ray 12.1-15.2; third pectoral-fin ray 10.2-14.0; pelvic-fin spine 6.2-10.2; second segmented pelvic-fin ray 14.2-23.7; caudal-fin length 23.3-29.1.

Live coloration: Pale form (based on photographs of specimens from Sadh and Masirah Id, Oman and on field and aquarium notes taken by J.K.L. Mee from live specimens; Plates 10F-G): head and body orangish brown to brown, paler to much paler on breast and lower part of head; brown or grey to dark grey stripe from middle of upper lip to anteroventral edge of eye, then from posterodorsal corner of eye to anterior lateral-line origin, and along dorsal part of body to upper edge of caudal peduncle; stripe sometimes diffuse, particularly posteriorly; large black spot on opercle immediately behind dorsal part of preopercle, spot edged anteriorly with blue to bright blue; lower part of head sometimes with indistinct to distinct grey to bright blue lines and spots; posterodorsal rim of eye dark grey to black; iris reddish brown to bright red with blue suboval ring around pupil; each scale on flanks within and around dark stripe with bluish grey basal spot; each scale on flanks above anal fin and on caudal peduncle with pale brown to orange or bright red spot centrally; dorsal fin brownish orange to brownish or yellowish hyaline, with blue distal margin, this sometimes edged proximally with bright red; dark grey spot at base of each segmented dorsal-fin ray, and about three to nine oblique rows of blue to grey spots and streaks on remainder of fin; anal fin brownish orange to brownish hyaline or pale brown, with three to five rows of blue spots and blue distal margin, distal margin sometimes edged proximally with bright red; caudal fin brownish orange to pale brown, with dark body stripe extending on to fin; narrow, brown stripe on lower part of fin; upper and lower margins of fin outside dark stripes usually abruptly paler, sometimes with alternating bright red and bright blue narrow stripes; pectoral fins pinkish hyaline to red, base of fins usually pale yellow or pink pale to dark grey; pelvic fins pale pink to blue or hyaline. Dark form (based on photographs of specimens from Sadh, Oman and on field and aquarium notes taken by J.K.L. Mee from live specimens; Plate 10H): head and body dark grey to black, sometimes with reddish tinge; large black spot on opercle immediately behind dorsal part of preopercle, spot edged anteriorly with blue to bright blue; iris bright red, becoming dark grey to black on edges, with bright blue suboval ring around pupil; posterior part of body and caudal peduncle with scattered, small bright blue to turquoise spots; dorsal, anal, caudal and pelvic fins dark reddish grey to black, with scattered, small bright blue to turquoise spots and bright blue to turquoise distal margins; pectoral fins dark grey to black basally, becoming red distally.

Preserved coloration: Pale form: pattern similar to live coloration, head and body becoming brown, paler ventrally; dark stripe on head and body becoming grey-brown in front of eye, and brown to grey-brown on body; blue-edged black spot on opercle becoming dark grey-brown; bluish grey and blue spots on flanks and fins becoming brown to greyish brown; pale orange spots above anal fin and on caudal peduncle becoming pale yellow to pale brown. Dark form: pattern similar to live coloration, head and body becoming dark grey-brown; blue-edged black spot on opercle becoming dark grey-brown to black; scattered, small bright blue to turquoise spots on body and fins disappear.

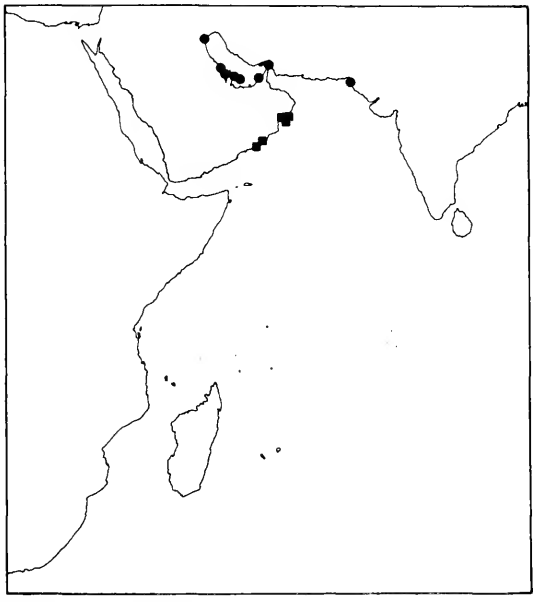

Figure 53. Distributional records for *Pseudochromis omanensis* (squares) and *P. persicus* (closed circles).

HABITAT AND DISTRIBUTION: *Pseudochromis omanensis* is known only from central and southern Oman (Figure 53). It has been observed (Gill & Mee, 1993: 58) and collected from shallow reef areas at depths ranging from 2 to 15 m.

COMPARISONS: The combination of III,29-31 dorsal-fin rays and 54-67 scales in lateral series distinguishes *P. omanensis* from all other pseudochromines except *P. persicus*. These two species are also similar in other meristic, coloration and morphometric details, and in attaining a large size (larger than any other *Pseudochromis* species). *Pseudochromis omanensis* differs from *P. persicus* in having (see Appendix 1) fewer scales between lateral lines (3 versus 3-5, with a strong mode for 4) and fewer circumpeduncular scales (20-22, usually 20, versus 20-25, rarely 20). Gill & Mee (1993) suggested that *P. omanensis* differed from *P. persicus* in lacking scattered bright blue (dark grey to black in preservative) punctate spots over the body, but the examination of additional materials collected by J.E. Randall obliges modification of this character, as such spots are present in the dark form of *P. omanensis*. However, unlike in *P. persicus*, these disappear following preservation.

REMARKS: *Pseudochromis omanensis* is one of the largest species in the genus, attaining about 120 mm SL (Gill & Mee, 1993: 58). J.K.L. Mee (pers. comm.) noted that a dark form specimen (the holotype) changed to the pale form soon after it was introduced into an aquarium. Live colour photographs of the pale form of the species are provided by Gill & Mee (1993), Randall (1995: figs 330A and 337) and Debelius (1998); a live colour photograph of the dark form is provided by Randall (1995: fig. 338).

ETYMOLOGY: The specific epithet is for the Sultanate of Oman.

MATERIAL EXAMINED: OMAN: Barr al Hikman, ROM 65741, 1(1), 76.7 mm SL (paratype; subsequently cleared and stained), USNM 32460, 1(1), 73.7 mm SL (holotype); off NE end of Masirah Id, BPBM 36103, 4(4), 41.1-96.5 mm SL; S end of Masirah Id, BPBM 36147, 2(2), 59.4-60.0 mm SL; Mahallah, BPBM 35952, 1(1), 97.0 mm SL; Sadh, CAS 66901, 81.0 mm SL (paratype), BPBM 35962, 4(4), 54.7-90.7 mm SL.

Pseudochromis persicus Murray

Persian Dottyback
Figure 53; Plates 10I-J

Pseudochromes persicus Murray, 1887: 49 (type locality: Persian Gulf; generic name misspelt).

Pseudochromis persicus; Regan, 1905: 330 (list; authorship wrongly attributed to Boulenger); Lubbock, 1975: 121, pl. 3, fig. d (description; distribution; lectotype designation); Randall et al., 1978: 215, colour pl. 78 (colour fig.; Persian Gulf); Relyea, 1981: 67, pl. 4, figs a and b (distribution; colour figs; Bahrain); Kuronuma & Abe, 1986: 91 (description; Arabian Gulf); Al-Baharna, 1986: 202 (description; colour figs); Smith et al., 1987: 135 (list); Baensch & Debelius, 1992: 978 (distribution; colour fig.); Gill & Mee, 1993: 58, fig. 9 (habitat and distribution; colour fig.); Debelius, 1993: 114 (habitat and distribution; colour fig.); Gill & Randall, 1994: 16 (key); Lieske & Myers, 1994: pl. 32, fig. 12 (colour fig.; habitat and distribution); Randall, 1995: 143, figs 339-340 (description; distribution; colour figs); Debelius, 1996: 114 (colour fig.); Carpenter et al., 1997: 148 (description; habitat notes; figs); Debelius, 1998: 71 (colour fig.; habitat and distribution).

Pseudochromis (Klunzingerina) persicus; Fowler, 1931b: 35 (compilation).

DIAGNOSIS: *Pseudochromis persicus* is distinguished from congeners in having the following combination of characters: scales in lateral series 51-62; segmented dorsal-fin rays 29-31; scales between lateral lines usually 4 (rarely 3 or 5); and circumpeduncular scales 20-25, rarely 20. It is also distinctive in having a dark grey to black (dark blue in life) blotch on the operculum behind the upper edge of the preopercle in combination with a scattering of small dark grey to black (bright blue in life) spots on the body.

DESCRIPTION (based on 33 specimens, 28.0-116.5 mm SL): dorsal-fin rays III,29-31, last 9-31 segmented rays branched (all branched in specimens larger than about 40 mm SL); anal-fin rays III,19-21, last 10-20 segmented rays branched (all branched in specimens larger than 40 mm SL); pectoral-fin rays 18-20; upper procurrent caudal-fin rays 7-8; lower procurrent caudal-fin rays 6-8; total caudal-fin rays 31-33; scales in lateral series 51-62; anterior lateral-line scales 42-56; anterior lateral line terminating beneath segmented dorsal-fin ray 22-28; posterior lateral-line scales 7-17 + 0-2; scales between lateral lines 3-5; horizontal scale rows above anal-fin origin 15-18 + 1 + 2-4 = 19-22; circumpeduncular scales 20-25; predorsal scales 21-29; scales behind eye 3-5; scales to preopercular angle 5-8; gill rakers 4-7 + 10-13 = 15-19; pseudobranch filaments 9-16; circumorbital pores 18-88; preopercular pores 11-37; dentary pores 4-5; posterior interorbital pores 1-5.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although often with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of PIO pores to anterior AIO pores; opercle with 3-5 usually relatively well-developed serrations; teeth of outer ceratobranchial-1 gill rakers varying from weakly to well developed, tending to run most of length of rakers, although often restricted to tips of lower rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1 + 1*/1*/1; dorsal-fin spines stout with pungent tips; anterior anal-fin pterygiophore formula 3/1 + 1/1 + 1/1 + 1*/1 + 1*; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine stout with pungent tip; second or third segmented pelvic-fin ray longest; caudal fin rounded to truncate with upper lobe weakly to strongly produced, sometimes with lower lobe also produced; vertebrae 10 + 16; epineurals 16-18; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-5 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, conical teeth becoming larger and more curved on middle of jaw; vomer with 1-2 rows of small conical teeth, forming chevron; palatines with 2-4 rows of small conical teeth arranged inelongate patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 25 specimens, 28.0-116.5 mm SL): head length 19.5-26.4; orbit diameter 5.4-9.3; snout length 5.4-6.7; fleshy interorbital width 3.8-5.0; bony interorbital width 2.4-3.3; body width 9.0-12.8; snout tip to posterior tip of retroarticular bone 11.8-14.3; predorsal length 26.4-32.2; prepelvic length 28.3-34.1; posterior tip of retroarticular bone to pelvic-fin origin 17.1-21.9; dorsal-fin origin to pelvic-fin origin 23.3-28.2; dorsal-fin origin to middle dorsal-fin ray 33.2-42.2; dorsal-fin origin to anal-fin origin 36.7-42.7; pelvic-fin origin to anal-fin origin 21.0-31.7; middle dorsal-fin ray to dorsal-fin termination 26.3-32.2; middle dorsal-fin ray to anal-fin origin 21.9-26.8; anal-fin origin to dorsal-fin termination 36.4-43.0; anal-fin base length 32.3-38.6; dorsal-fin termination to anal-fin termination 12.5-15.6; dorsal-fin termination to caudal peduncle dorsal edge 9.1-11.3; dorsal-fin termination to caudal peduncle ventral edge 16.0-19.6; anal-fin termination to caudal peduncle dorsal edge 16.8-20.7; anal-fin termination to caudal peduncle ventral edge 9.0-12.3; first dorsal-fin spine 1.7-3.5; second dorsal-fin spine 3.6-5.5; third dorsal-fin spine 5.2-8.4; first segmented dorsal-fin ray 9.9-12.6; fourth last segmented dorsal-fin ray 13.6-24.0; first anal-fin spine 1.7-3.2; second anal-fin spine 2.9-5.4; third anal-fin spine 4.5-6.5; first segmented anal-fin ray 7.8-11.3; fourth last segmented anal-fin ray 13.5-17.6; third pectoral-fin ray 11.1-14.4; pelvic-fin spine 6.0-9.3; second segmented pelvic-fin ray 15.8-21.6; caudal-fin length 24.3-32.0.

Live coloration: Pale form (based on photographs of specimens from the Persian Gulf and the Strait of Hormuz, and observations on individuals in Abu Dhabi, Persian Gulf; Plate 10I): head and body pale grey, becoming pale pinkish to orangish grey ventrally on head and breast; grey to dark grey stripe extending from middle of upper lip through eye to upper edge of caudal peduncle, area above stripe grey to greyish brown; cheeks with two pale to bright blue oblique stripes; operculum with irregular pale to bright blue spots and streaks; large dark grey to black spot on operculum behind upper edge of preopercle, anterior margin of spot with bright blue bar; iris orange to reddish brown with two bright blue oblique bars, one above and one below pupil; body with scattered small bright blue spots; dorsal and anal fins orangish brown to brown or brownish hyaline with bright blue distal margin; bright blue spot at base of each dorsal and anal fin ray, remainder of each fin with bright blue spots and streaks arranged in closely spaced oblique to horizontal lines; caudal fin brown to brownish hyaline, darker on upper margin, with scattered bright blue spots, sometimes with bright blue distal margin; pectoral fins hyaline; pelvic fins pale blue. Dark form (based on photographs of specimens from Bahrain, observations on individuals in Abu Dhabi, Persian Gulf, and on notes from and photographs of captive specimens; Plate 10J): similar to pale form except ground colour of head and body dark greyish brown to dark grey or black, sometimes becoming orangish ventrally, with ventral part of head and breast orange to pale grey; ground colour of dorsal, anal and caudal fins orangish brown basally, becoming dark grey to black distally; pelvic fins pale grey, becoming orange then dark grey to black distally with five or six rows of bright blue spots.

Preserved coloration: pattern similar to live colourations, pale grey areas on head, body and fins becoming pale brown, grey areas becoming grey to brown and dark grey to black areas becoming dark brown to dark grey; dark spot on operculum remains, becoming dark grey to black; pale blue markings becoming grey to brown; scattered bright blue spots on body becoming dark grey to black; bright blue spots on fins either disappear or becoming pale brown to brown; pelvic fins becoming pale grey to pale brown (pale form) or dark grey to dark brown (dark form).

HABITAT AND DISTRIBUTION: This species is known only from the Persian Gulf and Arabian Sea, from Kuwait (Relyea, 1981: 67; N. Downing, pers. comm.) east to Karachi, Pakistan (Figure 53). It has been observed (Lubbock, 1975: 125; pers. obs.) and collected around coralline algae, coral and rock reefs and rubble areas at depths ranging from 1 to 25 m.

COMPARISONS: *Pseudochromis persicus* is relatively distinct within the Pseudochrominae in having the following combination of characters: segmented dorsal-fin rays 29-31, and scales in lateral series 51-62. The only other pseudochromine with a similar combination of characters is *P. omanensis*. Characters distinguishing these two species are discussed under *Comparisons* for *P. omanensis*.

REMARKS: *Pseudochromis persicus* is one of the largest species in the genus; the largest specimen examined measured 116.5 mm SL. (The same specimen was incorrectly reported as 120.0 mm SL by Lubbock, 1975: 121, 126.) As noted above, this species has dark and pale colour forms. The dark form has been illustrated by Randall et al. (1978), Relyea (1981: pl. 4, fig. b), Al-Baharna (1986), Baensch & Debelius (1992), Gill & Mee (1993), Debelius (1993, 1996, 1998) and Randall (1995: fig. 340), and the pale form has been illustrated by Lubbock (1975), Relyea (1981: pl. 4, fig.a), Al-Baharna (1986) and Randall (1995: fig. 339). As noted by Lubbock (1975: 125) and Gill & Mee (1993), these colourations are not associated with either size or sex.

Gill & Mee (1993: 58) noted that the blenniid fish, *Ecsenius pulcher* has an almost identical distribution pattern to *P. persicus* and shows similar colour variation. Springer (1988: 31, pl. 2, figs 2 and 4) noted that *E. pulcher* exhibits three live colour phases. Two of these, "uniform" and "horizontally bicoloured", are remarkably similar to the dark and pale forms, respectively, of *P. persicus*. Although Springer suggested that the horizontally bicoloured phase of the blenny may represent a transient, emotionally-induced pattern, the possibility of mimetic interaction between these species should be investigated. Alternatively, the two species may be responding in a similar fashion to some ecological factor.

ETYMOLOGY: The specific epithet refers to the type locality.

MATERIAL EXAMINED: PERSIAN (ARABIAN) GULF: BMNH 1887.9.22:45, 1(1), 98.3 mm SL (lectotype), BMNH 1887.9.22:46-48, 3(3), 69.5-93.0 mm SL (paralectotypes); Saudi Arabia, Turut Bay, Ras Tanura, USNM 147902, 42(0); Saudi Arabia, Turut Bay, Zaal Id, USNM 147903, 32(9, 28.0-104.4 mm SL), 13.9-104.4 mm SL; Bahrain, BMNH 1973.12.20:1-7, 7(7), 33.5-95.0 mm SL; Bahrain, off Muharraq Id, BPBM 29514, 4(0), 72.0-80.0 mm SL; Bahrain, E of Sitrah Id, BPBM 21298, 3(0), 60.0-107.0 mm SL, USNM 267100, 2(0); Bahrain, reef at

26°08'20"N 50°43'20"E, BPBM 30519, 1(1), 77.6 mm SL; Qatar, Aliyah Id, BPBM 21491, 4(4), 64.3-102.0 mm SL (68.8 mm SL specimen subsequently cleared and stained); Das Id, BPBM 16407, 2(2), 28.4-55.9 mm SL. PAKISTAN: Karachi, BMNH 1899.1.24:6, 1(1), 116.5 mm SL, BMNH 1903.5.14:17-23, 8(8), 61.8-104.0 mm SL.

Pseudochromis perspicillatus Günther
Bandit Dottyback
Figure 36; Plates 11A-B

Pseudochromis perspicillatus Günther, 1862a: 193 (not pl. 27, fig. c; type locality: China); Weber, 1913: 263 (Kei Ids); Roxas & Martin, 1937: 123 (list); Fowler, 1938b: 426 (compilation); Herre, 1953: 373 (list); Burgess et al., 1988: pl. 154 (colour fig.); Burgess et al., 1991: 206 (colour fig.); Gill & Randall, 1992: 44 (comparison); Lieske & Myers, 1994: pl. 32, fig. 6 (colour fig.; habitat and distribution); Eichler & Myers, 1997: 119 (colour fig.; habitat and distribution); Allen, 1997: 96, pl. 29-21 (description; distribution; colour fig.); Gill, 1999b: 2563 (key).

Amblyopus sagitta [*non* Günther, 1862a]; Günther, 1862a: pl. 27, fig. a.

Pseudochromis rex Seale, 1910: 529 (type locality: Sitanki Id, Jolo Archipelago, Philippines); Herre, 1953: 373 (list).

Pseudochromis (Pseudochromis) perspicillatus; Weber & de Beaufort, 1931: 132, fig. 24 (Kei Ids).

Pseudochromis (Devisina) perspicillatus; Fowler, 1931b: 27 (compilation; synonymy with *P. rex* Seale; incorrect synonymy with *P. ransonneti* Steindachner).

Pseudochromis similimus Herre, 1933a: 19 (type locality: Culion, Philippines); Roxas & Martin, 1937: 123 (list); Böhlke, 1953: 70 (list); Herre, 1953: 373 (list).

DIAGNOSIS: *Pseudochromis perspicillatus* is distinguished from congeners by the following combination of characters: palatine tooth patches inserted medially behind posterolateral arms of vomerine tooth patch; circumpeduncular scales 20-24; and upper part of body with dark longitudinal stripe extending from middle of upper lip through eye and crossing middle of anterior lateral line to join dark basal stripe on middle part of dorsal fin.

DESCRIPTION (based on 26 specimens, 29.5-84.2 mm SL): dorsal-fin rays III,24-26, last 8-26 segmented rays branched (all or all but first 1-2 branched in specimens larger than about 40 mm SL); anal-fin rays III,13-14, last 11-14 segmented rays branched (all or all but first branched in specimens larger than 30 mm SL); pectoral-fin rays 17-20; upper procurrent caudal-fin rays 6-8; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 29-31; scales in lateral series 38-42; anterior lateral-line scales 28-35; anterior lateral line terminating beneath segmented dorsal-fin ray 15-20; posterior lateral-line scales 3-14 + 0-2; scales between lateral lines 4-6; horizontal scale rows above anal-fin origin 14-18 + 1 + 3-4 = 18-23; circumpeduncular scales 20-24; predorsal scales 22-27; scales behind eye 2-4; scales to preopercular angle 5-7; gill rakers 6-10 + 12-14 = 19-23; pseudobranch filaments 9-14; circumorbital pores 19-41; preopercular pores 12-30; dentary pores 4-5; posterior interorbital pores 1-3.

Lower lip usually incomplete, although sometimes complete or incomplete with only weak symphyseal interruption; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of posterior AIO pores to midway between anterior AIO and posterior nasal pores; opercle with 3-8 usually large, distinct serrations; teeth of outer ceratobranchial-1 gill rakers moderately to well developed, these arranged in two rows running most of length of rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1/1/1 + 1*/1 or S/S/S + 3/1 + 1/1/1/1/1/1 + 1/1/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1 or 3/1/1 + 1*/1; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray usually longest, although sometimes subequal to third; caudal fin rounded to truncate in small specimens, becoming emarginate to lunate in large specimens; vertebrae 10 + 16; epineurals 13-14; epurals 3.

Upper jaw with 1-4 pairs of curved, enlarged caniniform teeth, and 4-5 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, caniniform teeth, and 2-4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-3 irregular rows of small conical teeth arranged in elongate patch, anterior tip of patch directed medially behind posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 19 specimens, 29.5 -84.2 mm SL): head length 23.6-30.2; orbit diameter 7.1-11.5; snout length 7.1-8.4; fleshy interorbital width 5.3-7.2; bony interorbital width 3.4-5.5; body width 11.5-14.2; snout tip to posterior tip of retroarticular bone 14.5-17.6; predorsal length 33.3-40.0; prepelvic length 31.7-35.5; posterior tip of retroarticular bone to pelvic-fin origin 17.9-21.0; dorsal-fin origin to pelvic-fin origin 29.6-35.2; dorsal-fin origin to middle dorsal-fin ray 30.4-39.3; dorsal-fin origin to anal-fin origin 42.8-49.1; pelvic-fin origin to anal-fin origin 27.3-37.7; middle dorsal-fin ray to dorsal-fin termination 22.8-26.5; middle dorsal-fin ray to anal-fin origin 26.4-33.3; anal-fin origin to dorsal-fin termination 32.5-38.2; anal-fin base length 22.8-28.6; dorsal-fin termination to anal-fin termination 15.4-18.8; dorsal-fin termination to caudal peduncle dorsal edge 8.8-11.5; dorsal-fin termination to caudal peduncle ventral edge 18.3-21.1; anal-fin termination to caudal peduncle dorsal edge 19.0-22.6; anal-fin termination to caudal peduncle ventral edge 10.8-13.1; first dorsal-fin spine 2.3-4.4; second dorsal-fin spine 5.0-8.8; third dorsal-fin spine 7.2-12.5; first segmented dorsal-fin ray 11.7-15.6; fourth last segmented dorsal-fin ray 16.5-19.7; first anal-fin spine 1.9-4.1; second anal-fin spine 5.9-9.8; third anal-fin spine 7.4-11.9; first segmented anal-fin ray 10.1-14.9; fourth last segmented anal-fin ray 15.1-18.9; third pectoral-fin ray 14.3-18.3; pelvic-fin spine 9.6-13.6; second segmented pelvic-fin ray 19.8-26.4; caudal-fin length 21.9-28.2.

Live coloration (based on photographs of specimens from the Philippines, Sabah and Indonesia, and on field notes made by R. Lubbock in the Philippines; Plates 11A-B): head and

body cream to pale yellowish brown, becoming pale pinkish to yellowish or purplish brown posteriorly; narrow dark grey to bluish black or black stripe extending from snout tip through eye and above operculum to middle part of dorsal fin; dorsal contour of head and nape above dark stripe dark bluish grey to dark brown, with scattered small black spots; head below dark stripe sometimes with irregular pale blue or pale yellow to grey markings; iris pale pink to pale yellow below dark stripe, with dark grey to blue suboval ring around pupil; dorsal part of flanks directly below dark stripe sometimes dark bluish grey; several to most scales on dorsoanterior part of flanks each with basal dark blue to turquoise spots; scales of sides of body and caudal peduncle usually with yellow or orange to bluish grey posterior edges, these aligning to form oblique lines; anterior few to most scales of anterior lateral line each with basal white to golden spot; dorsal fin pale bluish grey to greyish hyaline, with basal part of fin dark grey to black; dark grey to black portion broadest on anterior part of fin; pale area of fin sometimes with three to six dark grey stripes; several to many scattered small dark grey to black dots on basal two-thirds of fin; anal fin pale blue to pale yellow or white basally, becoming greyish hyaline distally, sometimes with three to six narrow horizontal to oblique pale blue stripes; caudal fin pinkish brown to pale lemon yellow basally, becoming pale bluish grey to greyish hyaline distally, with upper and lower borders of fin pale yellow to whitish grey anteriorly; pectoral and pelvic fins pinkish hyaline to hyaline.

Preserved coloration: pattern similar to live coloration, cream to pale brown areas on head and body becoming pale yellowish brown to pale brown; dark bluish grey areas on dorsal contour of head and body becoming dark brown; dark blue spots on upper flank scales becoming dark brown to dark grey, these particularly obvious in small specimens; yellow or orange to grey scale markings becoming pale grey; dark grey to black area on dorsal fin becoming dark brown to dark grey; anal fin yellowish hyaline to dusky hyaline, usually with three to six pale grey stripes on basal half of fin, sometimes with several scattered small dark grey to black spots; caudal fin hyaline to brownish hyaline, usually with dusky grey stripes extending from dorsal and ventral edges of fin to upper and lower ray tips, respectively; area on caudal fin outside of stripes pale grey; pectoral fins hyaline; pelvic fins hyaline to pale yellow.

HABITAT AND DISTRIBUTION: *Pseudochromis perspicillatus* was originally described from specimens collected by Captain E. Belcher from "China." However, this locality is possibly in error as Belcher's "China" and "China Seas" specimens have since been shown to have come from various localities (Winterbottom, 1976: 178; Springer & Williams, 1994: 148); a summary of Belcher's collecting activities is given by Wheeler (1997: 121). *Pseudochromis perspicillatus* is presently known only from the Philippines and Indonesia (Figure 36). It has been collected and observed (based on R. Lubbock's unpublished field notes) mainly from isolated coral and rock reef and sponge patches on sand-, rubble- and silt-bottom areas at depths ranging from 3 to 27 m.

COMPARISONS: *Pseudochromis perspicillatus* is distinguished from all other pseudochromids except *P. colei* in having medially inserted palatine tooth patches in combination with a dark longitudinal stripe on the upper part of the body. Differences between the two species are discussed under *Comparisons* for *P. colei*.

REMARKS: *Pseudochromis perspicillatus* is a relatively large species; the largest specimen examined measured 84.2 mm SL. Colour illustrations of this species are provided in Burgess et al. (1988, 1991), Eichler & Myers (1997) and Allen (1997). Weber & de Beaufort (1931) illustrated a specimen of this species erroneously showing scales beneath the eye covering the "lachrymal" (infraorbital 1); infraorbital-1 scales were not observed on their specimen or on any other pseudochromids examined in this study.

Bleeker (1875: 20) suggested a close similarity of *P. perspicillatus* to *P. ransonneti*; this was followed by Weber (1913) and Weber & de Beaufort (1931). Fowler (1931b) considered *P. ransonneti* to be a junior synonym of *P. perspicillatus*, but later (Fowler, 1938a) reversed this decision. *Pseudochromis ransonneti* is a valid species that differs from *P. perspicillatus* in having, for example, fewer predorsal scales (14-18 versus 22-27), fewer gill rakers (3-6 + 10-12 = 13-17 versus 6-10 + 12-14 = 19-23), and the palatine tooth patches more-or-less contiguous with the posterolateral arms of the vomerine tooth patch (versus inserted medially behind the vomerine tooth patch posterolateral arms). The two species also differ markedly in live and preserved coloration.

Seale's (1910) type specimens of *Pseudochromis rex* were deposited in the Philippine Bureau of Science and were destroyed during World War II (Herre, 1953: 2). However, as noted by Fowler (1931b), his description is clearly based on the present species. In order to stabilize the nomenclature of the species, a neotype is here designated (CAS-SU 32956, 58.7 mm SL, from Sitankai). Examination of Herre's (1933a) *Pseudochromis similimus* holotype revealed that it is also referable to *P. perspicillatus*.

ETYMOLOGY: The specific epithet is from the Latin *perspicillum*, lens or spectacles, perhaps either with reference to the small lens-shaped spots on the nape, or to the dark stripe on the head (representing the arm of the spectacles).

MATERIAL EXAMINED: "CHINA": BMNH 1855.9.19:1500, 4(4), 30.0-69.0 mm SL (syntypes of *P. perspicillatus* Günther). PHILIPPINES: Mindoro Id, Galera Bay, USNM 150829, 1(1), 77.0 mm SL; Calamian Group, Culion Id, Culion, CAS-SU 25517, 1(1), 43.8 mm SL (holotype of *P. similimus* Herre); Masbate Id, CataiZgan Bay, USNM 150831, 3(3), 32.8-56.4 mm SL; Palawan Id, El-Nido, YCM P.12093, 1(1), 29.5 mm SL; Negros Id, off Dumaguete City, BPBM 22184, 2(2), 69.6-84.2 mm SL; Sulu Archipelago, Siluag Id, CAS 52441, 1(0), 58.0 mm SL; Sulu Archipelago, Jolo Id, USNM 150830, 1(1), 70.6 mm SL; Sulu Archipelago, Tumindao Id, Sitankai, CAS-SU 32956, 1(1), 58.7 mm SL (neotype of *P. rex* Seale), CAS-SU 69861, 1(1), 55.5 mm SL; Sicogon Id, off Estancia, USNM 339256, 2(2), 45.6-71.5 mm SL. SABAH, MALAYSIA: Bodgaya Ids, Teagan Id, WAM P.30405-002, 1(1), 53.2 mm SL. INDONESIA: Lombok Id, Gili Air, BPBM 30041, 1(1), 60.0 mm SL; Komodo Id, E of Turo Liu Point, BPBM 31546, 4(4), 48.5-73.9 mm SL (58.6 mm SL specimen subsequently cleared and stained); between Rinka and Kode

Ids, WAM P.30722-001, 2(2), 63.4-77.9 mm SL; Kai Besar (Great Kei Id), Banda Elat, ZMA 120.057, 1(1), 63.6 mm SL.

***Pseudochromis pesi* Lubbock**
Pale Dottyback
Figure 31; Plate 11C

Pseudochromis pesi Lubbock, 1975: 136, pl. 1, fig. d (type locality: bay at Jordan-Saudi Arabia border, Gulf of Aqaba); Randall, 1983: 59 (description and colour fig.); Debelius, 1986: 17 (colour fig.); Burgess et al., 1988: pl. 153 (colour fig.); Baensch & Debelius, 1992: 979 (colour fig.); Debelius, 1993: 114 (colour fig.; distribution in part); Gill & Randall, 1994: 16 (comparison); Goren & Dor, 1994: 28 (list); Lieske & Myers, 1994: pl. 32, fig. 2 (colour fig.; habitat and distribution); Debelius, 1996: 114 (colour fig.); Field & Field, 1998: 78 (colour fig.; Hurgada); Debelius, 1998: 68 (colour figs; habitat and distribution).

Pseudochromis olivaceus [*non* Rüppell, 1835]; Shpigel, 1997: 67 (colour fig.).

DIAGNOSIS: *Pseudochromis pesi* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 26-27 (usually 26); segmented anal-fin rays 14-15 (usually 15); pectoral-fin rays 17-18; scales in lateral series 39-44; horizontal scale rows above anal-fin origin 13-16 (usually 14-15) + 1 + 3-4 = 17-20 (usually 18-19); dorsal-fin origin to pelvic-fin origin 24.9-29.6 % SL; fourth last anal-fin ray 18.5-22.6 % SL; large dark spot on opercular flap; and upper part of head and body brown to dark brown (grey to black in life), the remainder of head and body pale yellow (pale pinkish grey to pearly white in life).

DESCRIPTION (based on 18 specimens, 24.7-73.1 mm SL): dorsal-fin rays III,26-27, last 8-27 segmented rays branched (all or all but first segmented rays branched in specimens larger than 35 mm SL); anal-fin rays III,14-15, last 12-15 segmented rays branched (all or all but first segmented rays branched in specimens larger than 35 mm SL); pectoral-fin rays 17-18; upper procurrent caudal-fin rays 7-8; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 30-32; scales in lateral series 39-44; anterior lateral-line scales 29-33; anterior lateral line terminating beneath segmented dorsal-fin ray 16-20; posterior lateral-line scales 3-9 + 0-2; scales between lateral lines 4-5; horizontal scale rows above anal-fin origin 13-16 + 1 + 3-4 = 17-20; circumpeduncular scales 19-20; predorsal scales 17-21; scales behind eye 2-4; scales to preopercular angle 4-7; gill rakers 5-6 + 12-13 = 17-19; pseudobranch filaments 9-12; circumorbital pores 19-29; preopercular pores 10-18; dentary pores 4; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although intermittent scales sometimes overlap fin bases; predorsal scales extending anteriorly to point ranging from vicinity of posterior AIO pores to anterior AIO pores; opercle with 4-6 usually well-developed serrations; teeth of outer ceratobranchial-1 gill rakers varying from weakly to well developed, but tending to run most of length of rakers, although often with only intermittent distribution along rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1*/1/1/1/1 + 1*/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1/1/1 + 1*/1; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray longest; caudal fin rounded, sometimes with posterior margin weakly rounded to truncate; vertebrae 10 + 16; epineurals 14-16; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on nine specimens, 24.7-73.1 mm SL): head length 23.3-30.3; orbit diameter 7.5-12.4; snout length 6.5-7.2; fleshy interorbital width 4.9-6.5; bony interorbital width 3.1-4.0; body width 10.9-13.4; snout tip to posterior tip of retroarticular bone 13.4-16.3; predorsal length 31.1-37.8; prepelvic length 30.1-38.6; posterior tip of retroarticular bone to pelvic-fin origin 18.6-21.1; dorsal-fin origin to pelvic-fin origin 24.9-29.6; dorsal-fin origin to middle dorsal-fin ray 32.5-37.2; dorsal-fin origin to anal-fin origin 40.1-42.9; pelvic-fin origin to anal-fin origin 25.8-31.6; middle dorsal-fin ray to dorsal-fin termination 21.5-28.7; middle dorsal-fin ray to anal-fin origin 25.7-27.5; anal-fin origin to dorsal-fin termination 32.6-36.7; anal-fin base length 25.5-29.0; dorsal-fin termination to anal-fin termination 14.6-17.2; dorsal-fin termination to caudal peduncle dorsal edge 10.3-11.7; dorsal-fin termination to caudal peduncle ventral edge 18.7-20.2; anal-fin termination to caudal peduncle dorsal edge 19.9-21.5; anal-fin termination to caudal peduncle ventral edge 11.0-12.6; first dorsal-fin spine 2.3-3.6; second dorsal-fin spine 4.4-6.5; third dorsal-fin spine 7.0-9.7; first segmented dorsal-fin ray 11.9-12.9; fourth last segmented dorsal-fin ray 18.5-23.1; first anal-fin spine 1.8-2.8; second anal-fin spine 4.5-6.4; third anal-fin spine 6.0-7.5; first segmented anal-fin ray 10.0-10.9; fourth last segmented anal-fin ray 18.5-22.6; third pectoral-fin ray 14.3-16.0; pelvic-fin spine 9.6-12.0; second segmented pelvic-fin ray 22.5-36.1; caudal-fin length 28.9-31.6.

Live coloration (based on photographs of specimens from the Gulf of Aqaba and Hurghada, Egypt; Plate 11C): head and body pale pinkish white to pearly grey; dorsal contour of head and body above line extending from snout tip to posterior part of dorsal fin grey to black; large dark blue to black spot on opercular flap, this bordered posteriorly with gold to bright orange; pale yellow line extending around ventral rim of orbit to middle of upper lip edge; opercular and cheek scales with irregular pale yellow markings; iris greyish brown with blue suboval ring around pupil; several to many scales on nape and anterior part of body within grey region each with small dark grey to black central spot; sides of body with series of pale pink lines following myosepta positions; dorsal fin grey to greyish hyaline, usually broadly grey to black basally, with two to four roughly horizontal rows of black dots; distal margin

of fin blue, sometimes bordered proximally with reddish hyaline to reddish grey; anal fin pale yellow to pale grey with blue distal margin; caudal fin pale grey to yellow with bright yellow to bright orange distal margin, usually with short submarginal grey stripe on upper part of fin; pectoral fins pinkish hyaline to hyaline; pelvic fins pale grey to hyaline.

Preserved coloration: pattern similar to live coloration, pale pinkish white to pearly grey areas on head and body becoming pale yellow; dorsal contour of head and body becoming brown to dark brown, paler posteriorly; pale pink and yellow markings on head and body becoming obscure; dark blue to black opercular spot flap becoming dark brown to black; dark grey to black spots on anterior part of body becoming dark brown; dorsal fin becoming hyaline to brown, darker basally, with two to five rows of small dark brown to black spots; anal fin becoming brownish hyaline, hyaline to whitish basally; caudal fin becoming pale yellow basally, whitish grey to hyaline posteriorly, grey submarginal stripe on upper lobe becoming brown; pectoral fins hyaline; pelvics hyaline to pale brown.

HABITAT AND DISTRIBUTION: This species is known only from the Gulf of Aqaba south to the vicinity of Hurghada, Egypt (Figure 31). It possibly also ranges to the southern Red Sea, based on a 33.9-mm-SL specimen collected recently by J.E. Randall at Jazirat-at-Ta'ir (15°33'N 41°50'E). The identification of this specimen (BPBM 35698) remains tentative. Although it resembles specimens of *P. pesi* from the Gulf of Aqaba in most details (including coloration), it differs in having 25 segmented dorsal-fin rays (versus 26-27, usually 26). Further specimens are needed in order to determine whether the Jazarit-at-Ta'ir specimen represents *P. pesi* or a separate, undescribed species. Records of *P. pesi* from South Africa by Smith (1980, 1986) are based on the pale colour form of the closely related *P. melas*. *Pseudochromis pesi* has been observed (Lubbock, 1975: 140) and collected from small isolated rock and coral patches over sand at depths ranging from 10 to 45 m.

COMPARISONS: This species differs from all other *Pseudochromis* except *P. aureolineatus, P. melas* and *P. punctatus* in having 26-27 segmented dorsal-fin rays, 14-15 segmented anal-fin rays, 39-44 scales in lateral series, a large dark spot on the opercular flap, and the upper part of the head and body brown to dark brown with the remainder pale yellow. Characters distinguishing the four species are discussed under *Comparisons* for *P. aureolineatus*.

REMARKS: *Pseudochromis pesi* is a moderately large species; largest specimen examined measured 73.1 mm SL. Live colour illustrations of it have been published by Lubbock (1975), Randall (1983), Debelius (1986, 1993, 1996, 1998), Burgess et al. (1988), Baensch & Debelius (1992) and Field & Field (1998).

ETYMOLOGY: The specific epithet is for Peter F. D'o. Ethrington-Smith (P.E.S.), who assisted Lubbock in collecting the holotype and other pseudochromid specimens.

MATERIAL EXAMINED: GULF OF AQABA, RED SEA: E side of Coral Id, BPBM 17891, 1(1), 44.6 mm SL; Marsa el Mukeibla, BPBM 17884, 1(1), 66.8 mm SL; El Himira, USNM 211771, 11(11), 24.7-59.9 mm SL (paratypes); bay at Jordan-Saudi Arabia border, BMNH 1973.12.20:94, 1(1), 73.1 mm SL (holotype), BMNH 1973.12.20.95, 1(1), 62.2 mm SL (paratype); Sinai Peninsula, BPBM 31819, 1(1), 51.8 mm SL; Dahab, Egypt, BPBM 13402, 2(2), 39.8-50.4 mm SL (paratypes).

Pseudochromis pictus Gill & Randall
Painted Dottyback
Figure 30; Plate 11D

Pseudochromis pictus Gill & Randall, 1998: 24, figs 8,9 (type locality: Kebola Bay, Alor, Indonesia); Gill, 1999b: 2564 (key).

DIAGNOSIS: *Pseudochromis pictus* differs from congeners in having the following combination of characters: dorsal-fin rays III,26, all segmented rays branched; anal-fin rays III,15; scales in lateral series 33-35; circumpeduncular scales 20; gill rakers 5-6 + 12 = 17-18; teeth of outer ceratobranchial-1 gill rakers well developed on raker tips only; dorsal-fin termination to anal-fin termination 16.7-18.1 % SL; and caudal fin pointed (rounded with middle rays produced).

DESCRIPTION (based on two specimens, 50.3-66.5 mm SL): dorsal-fin rays III,26, all segmented rays branched; anal-fin rays III,15, all segmented rays branched; pectoral-fin rays 18-19; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 5-6; total caudal-fin rays 28-30; scales in lateral series 33-35; anterior lateral-line scales 24-27; anterior lateral line terminating beneath segmented dorsal-fin ray 18-20; posterior lateral-line scales 6-9 + 0-1; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 13-15 + 1 + 3 17-19; circumpeduncular scales 20; predorsal scales 21-24; scales behind eye 3-4; scales to preopercular angle 5; gill rakers 5-6 + 12 = 17-18; pseudobranch filaments 12; circumorbital pores 27-30; preopercular pores 13-15; dentary pores 4-5; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to posterior nasal pores; opercle with 4-6 relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed on raker tips only; anterior dorsal-fin pterygiophore formula S/S/S + 3/1/1 + 1/1/1/1 + 1 or S/S/S + 3/1 + 1/1/1/1/1 + 1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1/1/1 + 1; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray longest; caudal fin pointed (rounded with middle rays produced); vertebrae 10 + 16; epineurals 13; epurals 3.

Upper jaw with 2 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw slightly larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-

less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL: head length 22.7-25.2; orbit diameter 8.4-9.1; snout length 5.9-6.2; fleshy interorbital width 6.2; bony interorbital width 4.2-4.4; body width 12.8-13.3; snout tip to posterior tip of retroarticular bone 13.2-14.5; predorsal length 31.1-33.0; prepelvic length 32.2-33.6; posterior tip of retroarticular bone to pelvic-fin origin 20.2-20.3; dorsal-fin origin to pelvic-fin origin 30.5-31.2; dorsal-fin origin to middle dorsal-fin ray 38.0-38.5; dorsal-fin origin to anal-fin origin 43.9; pelvic-fin origin to anal-fin origin 23.9-27.8; middle dorsal-fin ray to dorsal-fin termination 25.0-25.8; middle dorsal-fin ray to anal-fin origin 28.9-30.0; anal-fin origin to dorsal-fin termination 37.1-38.0; anal-fin base length 28.9-29.4; dorsal-fin termination to anal-fin termination 16.7-18.1; dorsal-fin termination to caudal peduncle dorsal edge 10.9-11.1; dorsal-fin termination to caudal peduncle ventral edge 19.7-20.1; anal-fin termination to caudal peduncle dorsal edge 19.8-21.7; anal-fin termination to caudal peduncle ventral edge 11.7-12.5; first dorsal-fin spine 3.2-3.4; second dorsal-fin spine 6.0-6.2; third dorsal-fin spine 8.1-9.3; first segmented dorsal-fin ray 12.0-14.1; fourth last segmented dorsal-fin ray 19.8-23.9; first anal-fin spine 2.4-2.9; second anal-fin spine 4.8; third anal-fin spine 6.9-7.4; first segmented anal-fin ray 10.7-11.5; fourth last segmented anal-fin ray 17.9-20.3; third pectoral-fin ray 14.7-16.7; pelvic-fin spine 11.4-11.7; second segmented pelvic-fin ray 27.4-32.0; caudal-fin length 37.9-41.2.

Live coloration (based on underwater photographs of the holotype and an individual estimated at 52 mm total length that was not collected at Alor Id; Plate 11D): head and body pale pink to white, becoming bluish grey behind middle of anal fin; lips and dorsal contour of head greyish yellow to bright yellow, snout tip with small grey spot; anterior edge of operculum with several very short pink stripes; posterior and ventral rim of orbit bright yellow, this edged with pale blue arc, which extends from dorsoposterior part of orbital rim to middle of upper lip; iris bright yellow to greyish yellow, paler ventrally, with bright blue suboval ring around pupil; diffuse yellowish grey to grey stripe extending from dorsoposterior part of orbital rim to above gill opening, then along upper part of body, merging posteriorly with bluish grey area; scales of grey area of body each with large pale yellow to pale pink basal spot, these most distinct on anterior lateral-line scales; edges of scales within grey area of body grey to dark grey or black, forming indistinct to distinct dark reticulation, these most prominent on anterior lateral-line scales; dorsal fin bright yellow on spinous portion and on outer third of fin, with distal margin narrowly grey, remainder of fin yellow (anteriorly) to greyish hyaline or grey (posteriorly); basal third of soft portion of dorsal fin with one (anteriorly) to three (posteriorly) rows of large dark grey to black spots forming reticulate pattern, spots becoming less distinct posteriorly; anal fin greyish hyaline to grey, darker basally; caudal fin bluish grey to grey, paler basally, with broad pinkish to greyish hyaline border dorsally and ventrally; pectoral fins pinkish hyaline to hyaline; pelvic fins pale grey to greyish hyaline.

Preserved coloration: pattern similar to live coloration, pale pink to white areas becoming brownish white; bluish grey to black markings becoming brown to dark greyish brown; yellow markings on head and body becoming pale brown; yellow and pale grey markings on fins becoming pale brown to white.

HABITAT AND DISTRIBUTION: *Pseudochromis pictus* is known only from Alor Id, Indonesia (Figure 30). It has been collected from around isolated rocks and coral heads in 28 to 36 m.

COMPARISONS: *Pseudochromis pictus* appears to be closely related to *P. reticulatus*. The two species are very similar in preserved coloration (the live coloration of *P. reticulatus* is unknown, but the similarity of preserved colours suggests it is probably also similar), share an unusual pointed caudal fin (rounded, however, in small specimens of *P. reticulatus*), and are very similar in most meristic and morphometric values. *Pseudochromis pictus* is readily distinguished from *P. reticulatus* in having 20 (versus 16) circumpeduncular scales, dorsal-fin termination to anal-fin termination 16.7-18.1 % SL (versus 14.7-16.2 % SL), and more extensive dark coloration on the anterior part of the body (extending more-or-less continuously along upper part of body to posterior edge of eye versus interrupted by pale area between dorsal edge of gill opening and anterior part of dorsal fin).

REMARKS: *Pseudochromis pictus* is known only from the holotype, paratype and an approximately 52 mm TL individual from the type locality that was not collected. Live colour photographs of the holotype and the 52-mm TL individual are provided by Gill & Randall (1998).

ETYMOLOGY: The specific epithet, from the Latin meaning paint, alludes to the striking live coloration. Gender is masculine.

MATERIAL EXAMINED: INDONESIA: Alor, Kebola Bay, BPBM 37349, 1(1), 50.3 mm SL (holotype), BPBM 37351, 1(1), 66.5 mm SL (paratype).

Pseudochromis punctatus **Kotthaus**

Blackback Dottyback

Figure 31; Plate 11E

Pseudochromis punctatus Kotthaus, 1970: 52, figs 225, 226 and 233 (type locality: 06°03'N 49°02.8'E, off Somalia); Gill & Randall, 1994: 15, fig. 4 (Al Hallaniyah Ids, Oman; discussion of nomenclature; comparison; key; colour fig.); Randall, 1995: 143, figs 341-342 (description; distribution; colour figs).

Pseudochromis melanotus Lubbock, 1975: 157 (*nomen novum*); Lubbock, 1977: 7, pl. 1C (description; black and white fig.).

DIAGNOSIS: *Pseudochromis punctatus* is distinctive within the genus in having the following combination of characters: dorsal part of head and body brown to dark-grey brown (dark grey to black in life), the remainder pale yellow to pale brown (white to brownish yellow in life); large dark brown (blue to black with gold edge in life) spot on opercular flap; dorsal and anal fins with several rows of dark brown to black (black in life) spots; segmented dorsal-fin rays 26; segmented anal-fin rays 15; pectoral-fin rays 17-19, usually 18; horizontal scale

rows above anal-fin origin 12-14 + 1 + 2-3 = 16-18; and middle dorsal-fin ray to anal-fin origin 23.1-25.0 % SL.

DESCRIPTION (based on five specimens, 50.0-76.4 mm SL): dorsal-fin rays III,26, all or all but first segmented rays branched; anal-fin rays III,15, all segmented rays branched; pectoral-fin rays 17-19; upper procurrent caudal-fin rays 6-8; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 29-32; scales in lateral series 40-43; anterior lateral-line scales 32-35; anterior lateral line terminating beneath segmented dorsal-fin ray 19-21; posterior lateral-line scales 5-11 + 0-2; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 12-14 + 1 + 2-3 = 16-18; circumpeduncular scales 20; predorsal scales 16-20; scales behind eye 3-4; scales to preopercular angle 4-6; gill rakers 4-5 + 11-12 = 16-17; pseudobranch filaments 10-13; circumorbital pores 23-30; preopercular pores 11-22; dentary pores 4; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without scale sheaths; predorsal scales extending anteriorly to point ranging from posterior AIO pores to anterior AIO pores; opercle with 4-7 small serrations; teeth of outer ceratobranchial-1 gill rakers well developed mainly on distal halves or tips of rakers only, although often with well- developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1 + 1*/1/1 + 1*/1 or S/S/S + 3/1 + 1/1/1/1 + 1/1/1/1 + 1/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1/1; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray longest; caudal fin rounded to truncate, sometimes with upper lobe slightly extended; vertebrae 10 + 16; epineurals 14-16; epurals 3.

Upper jaw with 2 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2 pairs of curved, enlarged caniniform teeth anteriorly, and 3-4 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL: head length 22.3-25.2; orbit diameter 6.9-9.0; snout length 5.7-6.5; fleshy interorbital width 4.6-5.0; bony interorbital width 3.1-3.3; body width 10.2-11.6; snout tip to posterior tip of retroarticular bone 13.0-14.2; predorsal length 29.6-32.0; prepelvic length 30.5-31.2; posterior tip of retroarticular bone to pelvic-fin origin 18.3-19.0; dorsal-fin origin to pelvic-fin origin 25.5-26.8; dorsal-fin origin to middle dorsal-fin ray 31.5-37.9; dorsal-fin origin to anal-fin origin 38.5-42.6; pelvic-fin origin to anal-fin origin 28.4-32.0; middle dorsal-fin ray to dorsal-fin termination 25.2-27.7; middle dorsal-fin ray to anal-fin origin 23.1-25.0; anal-fin origin to dorsal-fin termination 33.7-35.9; anal-fin base length 26.4-29.4; dorsal-fin termination to anal-fin termination 14.8-16.4; dorsal-fin termination to caudal peduncle dorsal edge 10.5-11.8; dorsal-fin termination to caudal peduncle ventral edge 17.5-19.6; anal-fin termination to caudal peduncle dorsal edge 18.4-21.2; anal-fin termination to caudal peduncle ventral edge 11.9-14.0; first dorsal-fin spine 1.8-3.3; second dorsal-fin spine 5.0-6.0; third dorsal-fin spine 7.0-8.6; first segmented dorsal-fin ray 11.0-12.4; fourth last segmented dorsal-fin ray 17.8-21.0; first anal-fin spine 1.9-3.0; second anal-fin spine 4.5-5.6; third anal-fin spine 6.0-7.0; first segmented anal-fin ray 9.8-11.2; fourth last segmented anal-fin ray 16.0-22.2; third pectoral-fin ray 13.6-15.0; pelvic-fin spine 8.9-10.0; second segmented pelvic-fin ray 21.6-27.7; caudal-fin length 27.5-31.6.

Live coloration (based on photographs of specimens from southern Oman; Plate 11E): head and body pale pinkish white to white or brownish yellow, sometimes with bright yellow spot centrally on each scale; dorsal contour of head and body above line extending from snout tip to posterior part of dorsal fin dark grey to black; large blue spot on opercular flap, becoming black posteriorly with bright yellow posterior border; iris greyish brown with blue suboval ring around pupil; several to many scales on nape and anterior part of body within dark grey to black region each with small dark grey to black or blue central spot; bright yellow oblique stripe on mid-upper part of body separating dark grey to black area from pale area; sides of body with series of pale pink to pinkish brown lines following myosepta positions; dorsal fin grey to greyish hyaline, usually broadly grey to black basally, with two to four roughly horizontal rows of small, black dots; distal margin of fin blue, at least anteriorly on spinous portion of fin; anal fin pale blue with two to four roughly horizontal rows of small, black spots; caudal fin pale grey to yellow with bright yellow margin, and with short submarginal grey stripe on upper part of fin; pectoral fins pinkish hyaline to hyaline; pelvic fins pale grey to hyaline.

Preserved coloration: pattern similar to live coloration, head and body becoming brown to dark grey-brown dorsally and abruptly pale yellow to pale brown ventrally; dark spot on opercular flap becoming brown to black; dark spots on scales and fins becoming dark brown to black.

HABITAT AND DISTRIBUTION: *Pseudochromis punctatus* is from the northeast coast of Somalia and southern Oman (Figure 31). It has been collected from reefs in 10 to 65 m.

COMPARISONS: This species closely resembles *P. aureolineatus, P. melas* and *P. pesi* in coloration, meristic values and general morphology. Characters distinguishing the four species are given under *Comparisons* for *P. aureolineatus*.

REMARKS: *Pseudochromis punctatus* is a moderately large species; the largest specimen examined measured 76.4 mm SL. It is known only from the holotype from Somalia and several specimens from southern Oman (Gill & Randall, 1994). Gill & Randall (1994) and Randall (1995) provide live colour photographs of specimens from southern Oman.

Lubbock (1975) proposed a replacement name, *melanotus*, under the assumption that *P. punctatus* Kotthaus (1970) was a junior secondary homonym of *Assiculus punctatus* Richardson (1846). However, although most previous authors have regarded it as a synonym of *Pseudochromis, Assiculus* is a valid genus and Lubbock's *nomen novum* is unnecessary (International Commission on Zoological Nomenclature, 1999:

Article 59.4; see also Gill & Randall, 1994: 17).

ETYMOLOGY: The specific epithet is from the Latin *punctum*, dot, with reference to the dorsal- and anal-fin coloration.

MATERIAL EXAMINED: OMAN: Al Hallaniyah (Kuria Muria) Ids, Hallaniyah Id, point at N end of Al Hallaniyah Bay (17°33'00"N 56°03'02"E), BPBM 36000, 1(1), 50.0 mm SL; Al Hallaniyah Ids, bay on SW side of Sawda Id, BPBM 35983, 1(1), 63.0 mm SL, BPBM 35988, 2(2), 72.5-76.4 mm SL. SOMALIA: NE of Obia (06°03'N 49°02.8'E), ZMH 5025, 1(1), 55.3 mm SL (holotype).

***Pseudochromis pylei* Randall and McCosker**
Yellow-tailed Dottyback
Figure 39; Plate 11F

Pseudochromis pylei Randall & McCosker, 1989: 8, figs 1-3 (type locality: Kadola Id, Pulau Pulau Penyu, Indonesia); Lieske & Myers, 1994: pl. 32, fig. 10 (colour fig.; habitat and distribution); Gill & Randall, 1998: 19, 21, fig. 4 (comparison; colour fig.); Myers, 1999: 121, 297 (description; distribution; fig.); Gill, 1999b: 2566 (key).

DIAGNOSIS: *Pseudochromis pylei* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 25-27, usually 26, with all rays branched; segmented anal-fin rays 14-15; anal-fin spines relatively stout, the second spine much stouter than the third; total caudal-fin rays 30-32; circumpeduncular scales 16; dorsal-fin origin to pelvic-fin origin 25.4-30.1 % SL; and brown (grey in life) spot present on pectoral-fin axil.

DESCRIPTION (based on seven specimens, 39.5-64.7 mm SL): dorsal-fin rays III,25-27, all segmented rays branched; anal-fin rays III,14-15, all or all but first segmented rays branched; pectoral-fin rays 18; upper procurrent caudal-fin rays 6-8; lower caudal-fin rays 7; total caudal-fin rays 30-32; scales in lateral series 36-40; anterior lateral-line scales 26-30; anterior lateral line terminating beneath segmented dorsal-fin ray 18-22; posterior lateral-line scales 7-10 + 0-2; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 12-13 + 1 + 2-4 = 15-18; circumpeduncular scales 16; predorsal scales 20-25; scales behind eye 2-3; scales to preopercular angle 3-4; gill rakers 5-6 + 12-14 = 17-19; pseudobranch filaments 10-12; circumorbital pores 20-29; preopercular pores 9-18; dentary pores 4; posterior interorbital pores 1-3.

Lower lip incomplete; dorsal and anal fins without scale sheaths; predorsal scales extending anteriorly to point ranging from midway between anterior AIO and posterior nasal pores to posterior nostrils; opercle with 4-6 serrations, these varying from inconspicuous to relatively strong; teeth of outer ceratobranchial-1 gill rakers well developed mainly on raker tips only; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1 + 1*/1/1/1 + 1; dorsal-fin spines moderately stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1 + 1/1/1 + 1; anal-fin spines relatively stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout and pungent; second segmented pelvic-fin ray longest; caudal fin rounded, posterior margin varying from rounded to almost truncate; vertebrae 10 + 16-17; epineurals 13-14; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 5-7 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw slightly larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatines with 2-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL: head length 22.7-24.3; orbit diameter 8.5-9.6; snout length 5.3-7.3; fleshy interorbital width 5.7-6.6; bony interorbital width 3.6-4.8; body width 11.4-13.1; snout tip to posterior tip of retroarticular bone 13.8-15.1; predorsal length 31.2-33.6; prepelvic length 30.6-32.8; posterior tip of retroarticular bone to pelvic-fin origin 17.9-19.8; dorsal-fin origin to pelvic-fin origin 25.4-30.1; dorsal-fin origin to middle dorsal-fin ray 32.3-35.6; dorsal-fin origin to anal-fin origin 39.8-42.9; pelvic-fin origin to anal-fin origin 28.0-31.6; middle dorsal-fin ray to dorsal-fin termination 23.5-25.8; middle dorsal-fin ray to anal-fin origin 22.5-27.1; anal-fin origin to dorsal-fin termination 30.9-34.8; anal-fin base length 25.5-28.3; dorsal-fin termination to anal-fin termination 14.3-16.1; dorsal-fin termination to caudal peduncle dorsal edge 11.2-13.9; dorsal-fin termination to caudal peduncle ventral edge 17.9-20.9; anal-fin termination to caudal peduncle dorsal edge 19.0-22.1; anal-fin termination to caudal peduncle ventral edge 12.1-14.7; first dorsal-fin spine 1.5-2.2; second dorsal-fin spine 4.2-5.3; third dorsal-fin spine 6.4-7.6; first segmented dorsal-fin ray 11.0-12.6; fourth last segmented dorsal-fin ray 13.3-18.5; first anal-fin spine 1.5-2.5; second anal-fin spine 3.8-5.1; third anal-fin spine 5.7-7.0; first segmented anal-fin ray 10.0-11.7; fourth last segmented anal-fin ray 12.7-15.6; third pectoral-fin ray 14.3-18.5; pelvic-fin spine 10.0-11.9; second segmented pelvic-fin ray 20.4-24.2; caudal-fin length 24.7-28.2.

Live coloration (based on photographs of specimens from Kadola Id, Banda Sea, and Kajoe Pangang Id, Flores Sea; Plate 11F): head and body dark purplish grey, grading ventrally to pinkish grey, through pale pink to white below level of eye; anterior portion of operculum with short reddish brown horizontal to oblique lines; lips yellowish grey to bright yellow; anterior, posterior and posteroventral sections of orbital rim pale yellow to pale orange; iris dark orange-brown to dark brown with turquoise ring around pupil; caudal peduncle and posterior part of body behind about fifteenth segmented dorsal-fin ray bright yellow, region immediately above anal-fin base abruptly pale pinkish white to white; scales of dark purplish grey to pinkish grey region of body each with dark grey to dark purplish grey central spot, these sometimes extending onto bright yellow portion of body; dorsal fin bluish to whitish hyaline anteriorly, becoming yellowish hyaline behind about fifth segmented ray; basal portion of fin pale blue to pale grey anteriorly, becoming pale yellow behind about fifth segmented ray; anal fin pale yellow to yellowish hyaline with about five pale bluish to bluish hyaline stripes, outer on

distal edge of fin; caudal fin bright yellow basally, becoming yellowish hyaline distally; pectoral fins hyaline, upper portion of fin base pinkish grey with small grey to dark grey spot on fin axil; pelvic fins pale blue to whitish hyaline anteriorly, becoming yellowish hyaline posteriorly.

Preserved coloration: pattern similar to live coloration, purplish and pinkish grey areas on head and body becoming greyish brown; bright yellow areas becoming pale yellow to pale brown; dorsal fin brownish hyaline with basal portion brown on anterior part of fin, remainder of fin yellowish hyaline with basal portion pale yellow; anal fin brownish hyaline basally, remainder of fin yellowish hyaline; caudal fin pale yellow, becoming yellowish hyaline posteriorly; pectoral fins hyaline with brown spot on fin axil; pelvic fins pale yellow to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis pylei* was described from several localities in the Banda and Flores Seas, Indonesia (Randall & McCosker, 1989). Its range was extended to include Belau based on a specimen collected at Ngemlis Id by R.L. Pyle in 1997 (Figure 39). The Belau record was reported on by Myers (1999), who also reported it from New Britain. However, I have not verified the latter record with the examination of photographs or specimens. *Pseudochromis pylei* has been observed (Randall & McCosker, 1989: 9) and collected from steep dropoffs and slopes around coral rock and rubble with sand areas at depths ranging from 40 to 87 m.

COMPARISONS: *Pseudochromis pylei* closely resembles *P. aurulentus* and *P. flavopunctatus* in most meristic and morphometric details and in having a dark spot on the axil of the pectoral fin. Characters distinguishing the three species are discussed under *Comparisons* for *P. aurulentus*. The following combination of characters distinguish it from all other pseudochromine species: dorsal-fin rays III,25-27, usually III,26, with all or all but first segmented rays branched; segmented anal-fin rays 14-15; anal-fin spines relatively stout and pungent, the second spine much stouter than the third; circumpeduncular scales 16; and brown (grey in life) spot present on pectoral-fin axil.

REMARKS: *Pseudochromis pylei* is a moderate-sized pseudochromine; the largest specimen examined measured 64.7 mm SL. Randall & McCosker (1989) and Gill & Randall (1998) provide colour illustrations of the species.

ETYMOLOGY: The specific name is for R.M. Pyle.

MATERIAL EXAMINED: INDONESIA: Flores Sea, Bonerate Group, Kajoe Pangang Id, USNM 292810, 1(1), 55.9 mm SL (paratype); Banda Sea, Tukangbesi Group, N side of Chowo Chowo Id, BMNH 1989.1.12.1, 1(1), 53.8 mm SL (paratype); Banda Sea, Pulau Pulau Penyu, NE side of Kadola Id, BPBM 31485, 1(1), 52.0 mm SL (holotype); Banda Sea, Pulau Pulau Penyu, W side of Kadola Id, BPBM 32337, 2(2), 39.5-41.1 mm SL (paratypes); Banda Sea, Pulau Pulau Penyu, E side of Kadola Id, AMS I.28496-001, 1(1), 59.5 mm SL (paratype). BELAU: Ngelmis Id, Blue Holes (7°08'06"N 124°13'54"E), BPBM 37702, 1(1), 64.7 mm SL.

***Pseudochromis quinquedentatus* McCulloch**
Spotted Dottyback
Figure 36; Plate 11G

Pseudochromis (Leptochromis) quinquedentatus McCulloch, 1926: 190, pl. 50 (type locality: off Cape Capricorn, Queensland, Australia).
Leptochromis quinquedentatus; McCulloch, 1929: 158 (list).
Pseudochromis (Devisina) quinquedentatus; Fowler, 1931b: 26 (compilation).
Pseudochromis quinquedentatus; Sainsbury et al., 1985: 138, 139 and 338 (description; colour fig.); Allen, 1985: 2508 (list, Western Australia); Paxton et al., 1989: 520 (list; distribution); Gill, 1990b: 129 (description; distribution; colour fig.); Lowe & Russell, 1990: 8 (list; distribution); Gill & Randall, 1992: 44 (comparison); Gill, 1993: 50 (distribution); Gill, 1999b: 2563 (key).
Devisina quinquedentata; Whitley, 1964a: 42 (list).

DIAGNOSIS: *Pseudochromis quinquedentatus* is distinguished from congeners in having the following combination of characters: palatine tooth patches inserted medially behind the posterolateral arms of the vomerine tooth patch; no dark stripe along dorsal part of the body; no dark bar in front of each anterior nostril; posterodorsal corner of operculum without dark spot; caudal fin rounded.

DESCRIPTION (based on 48 specimens, 30.2-81.4 mm SL): dorsal-fin rays III,25-27, all or all but first 1-2 segmented rays branched; anal-fin rays III,13-14, all segmented rays branched; pectoral-fin rays 17-20; upper procurrent caudal-fin rays 5-7; lower procurrent caudal-fin rays 4-6; total caudal-fin rays 26-29; scales in lateral series 39-47; anterior lateral-line scales 31-40; anterior lateral line terminating beneath segmented dorsal-fin ray 19-26; posterior lateral-line scales 4-14 + 0-1; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 13-16 + 1 + 2-4 = 16-21; circumpeduncular scales 19-21; predorsal scales 15-22; scales behind eye 2-4; scales to preopercular angle 6-9; gill rakers 4-7 + 10-12 = 15-18; pseudobranch filaments 11-15; circumorbital pores 23-38; preopercular pores 13-19; dentary pores 4; posterior interorbital pores 0-2.

Lower lip varying from incomplete with weak to moderate symphyseal interruption to complete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from posterior AIO pores to mid AIO pores; opercle with 4-7 large, distinct serrations, sometimes with additional 1-2 serrations ventral to subopercle junction; teeth of outer ceratobranchial-1 gill rakers well developed mainly on raker tips only, although sometimes with well-developed teeth running most of lengths of upper few rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1 + 1*/1* + 1*; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1*/1 + 1*; anal-fin spines stout and pungent, second spine stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray usually longest, although sometimes subequal to third; caudal fin rounded, sometimes with posterior margin slightly rounded to truncate; vertebrae 10 + 16; epineurals 14-16; epurals 3.

Upper jaw with 1-4 pairs of curved, enlarged caniniform teeth, and 4-6 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, caniniform teeth, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-3 rows of small conical teeth, forming chevron; palatine with 1-3 irregular rows of small conical teeth arranged in elongate patch, anterior tip of patch directed medially behind posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 20 specimens, 30.2-75.9 mm SL): head length 22.8-27.8; orbit diameter 6.0-11.3; snout length 5.7-6.8; fleshy interorbital width 4.7-5.8; bony interorbital width 3.0-4.0; body width 12.0-16.2; snout tip to posterior tip of retroarticular bone 14.2-16.4 predorsal length 31.2-34.5; prepelvic length 30.2-34.8; posterior tip of retroarticular bone to pelvic-fin origin 18.0-22.1; dorsal-fin origin to pelvic-fin origin 22.8-30.1; dorsal-fin origin to middle dorsal-fin ray 30.6-35.0; dorsal-fin origin to anal-fin origin 39.0-44.8; pelvic-fin origin to anal-fin origin 27.8-35.7; middle dorsal-fin ray to dorsal-fin termination 23.2-27.0; middle dorsal-fin ray to anal-fin origin 24.7-28.9; anal-fin origin to dorsal-fin termination 31.1-36.3; anal-fin base length 23.5-28.7; dorsal-fin termination to anal-fin termination 15.9-18.6; dorsal-fin termination to caudal peduncle dorsal edge 11.0-13.2; dorsal-fin termination to caudal peduncle ventral edge 18.5-20.9; anal-fin termination to caudal peduncle dorsal edge 19.5-22.3; anal-fin termination to caudal peduncle ventral edge 11.9-13.9; first dorsal-fin spine 1.4-2.5; second dorsal-fin spine 4.0-5.9; third dorsal-fin spine 6.0-7.9; first segmented dorsal-fin ray 10.0-12.2; fourth last segmented dorsal-fin ray 14.9-18.5; first anal-fin spine 1.3-2.7; second anal-fin spine 4.5-6.8; third anal-fin spine 6.0-8.1; first segmented anal-fin ray 10.0-12.0; fourth last segmented anal-fin ray 14.6-17.1; third pectoral-fin ray 13.1-16.3; pelvic-fin spine 7.8-10.2; second segmented pelvic-fin ray 15.4-21.5; caudal-fin length 23.3-26.6.

Live coloration (based on photographs of specimens from the North West Shelf of Australia and the Great Barrier Reef and on notes taken from captive specimens; Plate 11G): head and body dark bluish, greenish or purplish grey, becoming pink to bright yellow or bright orange either on head and anterior part of body or on abdomen and caudal peduncle; scales of upper part of head behind eye, nape and dorsoanterior part of body each with blue to dark grey basal spot; posteroventral rim of orbit dusky to dark grey; iris yellowish grey to bright orange with bright blue suboval ring around pupil; dorsal and anal fins blue or grey to violet, sometimes with anterior part of dorsal yellowish grey to bright yellow; caudal fin grey or yellowish grey to bright yellow, sometimes with upper and lower borders of fin either blue or bright yellow; pectoral fins pinkish, yellowish or orangish hyaline; pelvic fins bluish or greyish hyaline to pale pink or pale orange.

Preserved coloration: head and body yellowish brown to greyish brown, paler ventrally, with dark brown scale spots on dorsanterior part of body, nape and upper part of head behind eye; grey to dark grey curved streak usually present around posteroventral rim of eye, sometimes extending to first infraorbital bone; dorsal and anal fins dusky hyaline to brown, sometimes darker basally; usually with several rows of brown to grey spots and streaks; caudal fin either pale yellow, becoming hyaline posteriorly or yellowish brown basally, becoming brownish hyaline posteriorly; pectoral fins hyaline; pelvic fins hyaline to pale brown.

HABITAT AND DISTRIBUTION: *Pseudochromis quinquedentatus* is known only from northern Australia, from the vicinity of Monte Bello Ids, Western Australia, to the Capricorn Group, Great Barrier Reef (Figure 36). The record of this species from Indonesia by Gloerfelt-Tarp and Kailola (1984) is based on the closely related *P. steenei*, and Aoyagi's (1941a, c) record from the Ryukyu Ids is based on *P. luteus*. *Pseudochromis quinquedentatus* is known mainly from trawl specimens. It appears to be mainly found around small isolated reefs in weed and soft bottom areas. It has been collected at depths ranging from 14 to 55 m.

COMPARISONS: This species closely resembles *P. howsoni* from the North West Shelf of Australia, *P. moorei* from the Philippines and *P. steenei* from Indonesia in having medially inserted palatine tooth patches and in lacking a dark stripe on the dorsal part of the body. Characters distinguishing the three species are discussed under *Comparisons* for *P. howsoni*.

REMARKS: *Pseudochromis quinquedentatus* is a relatively large species; the largest specimen examined measured 81.4 mm SL. It has been illustrated in colour by Sainsbury et al. (1985) and Randall et al. (1990). The illustration in Gloerfelt-Tarp and Kailola (1984: 138) is referable to *P. steenei*.

ETYMOLOGY: The specific epithet is from the Latin *quinque*, five, and *dens*, tooth, and alludes to the five large serrations on the opercle of the holotype.

MATERIAL EXAMINED: No locality data (aquarium trade specimen), AMS I.31554-002, 1(1), 70.5 mm SL (subsequently cleared and stained). NORTH WEST SHELF, AUSTRALIA: 20 km E of Monte Bello Ids, WAM P.26188-020, 17(14, 30.2-65.3 mm SL), 30.2-65.3 mm SL; NE of Monte Bello Ids, CSIRO CA.1815, 1(1), 57.0 mm SL; Dampier Archipelago, NNE of Legendre Id, WAM P.26200-008, 2(2), 53.0-55.5 mm SL. ARAFURA SEA: N of Goulburn Ids, NTM S.11897-002, 1(1), 44.3 mm SL, NTM S.11925-005, 1(1), 51.0 mm SL, NTM S.11953-001, 1(1), 52.6 mm SL; N of Cape Stewart, AMS I.21944-001, 1(1), 80.3 mm SL. GULF OF CARPENTARIA: SW of Groote Eylandt, NTM S.626-627, 2(2), 69.7-73.8 mm SL; SE of Wellesley Ids, AMS I.15557-145, 2(2), 75.9-81.4 mm SL; 70 km NW of Cullen Point, NMV A.5130, 1(1), 56.2 mm SL. TORRES STRAIT: Dalrymple Islet, QM I.17512, 1(1), 42.7 mm SL; NE of Moa Id, QM I.17513, 1(1), 60.2 mm SL, QM I.17514, 1(1), 58.8 mm SL; NW of Prince of Wales Id, QM I.17516, 1(1), 40.2 mm SL; NE of Prince of Wales Id, QM I.17515, 1(1), 53.2 mm SL. EAST COAST OF QUEENSLAND: Cape York, NE of Hannibal Id, AMS I.20827-018, 2(2), 42.6-45.5 mm SL, QM I.16166, 1(1), 56.7 mm SL; NW of Nymph Id, AMS I.20754-004, 3(3), 40.7-52.7 mm SL, QM I.15685, 1(1), 58.8 mm SL, QM I.15848, 1(1), 45.0 mm SL; Cairns, AMS I.19337-003, 1(1), 50.0 mm SL (cleared and stained); NE of Port Douglas, QM I.18116, 1(1), 58.2 mm SL; S of Britomart Reef, QM I.23499, 1(1), 58.0 mm SL; E of Cape Capricorn, AMS

E.6712, 1(1), 46.9 mm SL (holotype); Capricorn Group, QM I.21378, 3(3), 47.7-59.7 mm SL.

***Pseudochromis ransonneti* Steindachner**
Yellowbelly Dottyback
Figure 39; Plate 11H

Pseudochromis ransonneti Steindachner, 1870: 562 (type locality: Singapore); Herre & Myers, 1937: 26 (Singapore Harbour); Fowler, 1938a: 142 (removal from synonymy with *P. perspicillatus* Günther); Gill, 1999b: 2564 (key).

Pseudochromis (Pseudochromis) ransonneti; Bleeker, 1875: 19 (compilation); Weber & de Beaufort, 1931: 132 (compilation).

Pseudochromis (Devisina) perspicillatus [*non* Günther, 1862a]; Fowler, 1931b: 27 (in part).

Pseudochromis xanthochir [*non* Bleeker, 1855a]; Herre & Myers, 1937: 27 (Singapore).

DIAGNOSIS: *Pseudochromis ransonneti* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 23-24, usually 24; segmented anal-fin rays 13-14, usually 14; scales in lateral series 36-39; circumpeduncular scales 19-20, usually 20; gill rakers 3-6 + 10-12 = 13-17; anal-fin spines relatively stout and pungent, the second much stouter than the third; and dorsal-fin origin to pelvic-fin origin 24.0-28.4 % SL.

DESCRIPTION (based on 24 specimens, 25.7-51.1 mm SL): dorsal-fin rays III,23-24, last 9-24 segmented rays branched (all or all but first 1-5 branched in specimens larger than about 30 mm SL); anal-fin rays III,13-14, all or all but first segmented rays branched; pectoral-fin rays 17-19; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 29-31; scales in lateral series 36-39; anterior lateral-line scales 25-32; anterior lateral line terminating beneath segmented dorsal-fin ray 15-21; posterior lateral-line scales 6-14 + 0-2; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 12-14 + 1 + 2-4 = 15-19; circumpeduncular scales 19-20; predorsal scales 14-18; scales behind eye 2-4; scales to preopercular angle 4-5; gill rakers 3-6 + 10-12 = 13-17; pseudobranch filaments 7-10; circumorbital pores 17-28; preopercular pores 9-15; dentary pores 4-5; posterior interorbital pores 1.

Lower lip incomplete; dorsal and anal fins without scale sheaths; predorsal scales extending anteriorly to point ranging from vicinity of PlO pores to anterior AIO pores; opercle with 3-6 relatively well-developed serrations; teeth of outer ceratobranchial-1 gill rakers usually well developed on distal halves or tips of rakers only, but sometimes with well-developed teeth arranged in two rows running most of length of rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/ 1/1/1 + 1*/1*/1; dorsal-fin spines relatively stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1/1 + 1/1/1 + 1/1 + 1; anal-fin spines relatively stout and pungent, second spine much stouter than third; pelvic-fin spine relatively stout and pungent; second segmented pelvic-fin ray longest; caudal fin varying from rounded (usually with weakly rounded to truncate posterior margin) to emarginate; vertebrae 10 + 16; epineurals 13-14; epurals 3.

Upper jaw with 2-3 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1 row of small conical teeth, forming chevron; palatine with 1-2 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 14 specimens, 25.7-51.1): head length 23.2-29.2; orbit diameter 7.4-10.8; snout length 5.7-6.4; fleshy interorbital width 4.3-5.4; bony interorbital width 2.8-3.5; body width 10.8-13.1; snout tip to posterior tip of retroarticular bone 14.0-16.7; predorsal length 32.8-37.7; prepelvic length 31.3-33.5; posterior tip of retroarticular bone to pelvic-fin origin 18.2-21.5; dorsal-fin origin to pelvic-fin origin 24.0-28.4; dorsal-fin origin to middle dorsal-fin ray 29.5-34.5; dorsal-fin origin to anal-fin origin 39.6-43.7; pelvic-fin origin to anal-fin origin 28.4-34.4; middle dorsal-fin ray to dorsal-fin termination 24.0-26.4; middle dorsal-fin ray to anal-fin origin 23.3-26.7; anal-fin origin to dorsal-fin termination 30.6-34.5; anal-fin base length 21.6-26.8; dorsal-fin termination to anal-fin termination 13.6-16.4; dorsal-fin termination to caudal peduncle dorsal edge 11.1-12.6; dorsal-fin termination to caudal peduncle ventral edge 17.3-20.2; anal-fin termination to caudal peduncle dorsal edge 18.1-21.1; anal-fin termination to caudal peduncle ventral edge 11.2-13.9; first dorsal-fin spine 1.6-3.5; second dorsal-fin spine 5.4-8.5; third dorsal-fin spine 7.9-10.9; first segmented dorsal-fin ray 11.1-13.6; fourth last segmented dorsal-fin ray 15.0-17.9; first anal-fin spine 2.7-5.0; second anal-fin spine 7.7-10.5; third anal-fin spine 7.6-10.1; first segmented anal-fin ray 10.8-13.1; fourth last segmented anal-fin ray 13.3-15.6; third pectoral-fin ray 14.1-16.3; pelvic-fin spine 8.7-11.5; second segmented pelvic-fin ray 17.9-21.5; caudal-fin length 23.2-26.1.

Live coloration (based on photographs of specimens from Salu Id, Singapore, and the Gulf of Thailand; Plate 11H): head and body bluish grey dorsally, narrowly mauve centrally and pale to pinkish or bright yellow ventrally; dark grey to dark blue stripe extending from snout tip to anterior edge of eye; posterior part of orbital rim dark grey; curved pale blue to pale pink stripe extending anteroventrally around orbital rim; subopercle with several horizontally-elongate reddish brown spots; iris orangish to reddish or yellowish brown with blue suboval ring around pupil; scales of body each with dark blue basal spot, these becoming less distinct on ventral part of body; dorsal fin bluish grey with irregular pale blue markings on anterior and basal parts of fin or hyaline; distal margin of fin pale blue, this sometimes bordered proximally with dark grey; anal fin bluish grey with three or four indistinct yellow stripes and blue distal margin; caudal fin bluish grey with broad yellow stripe extending from ventral edge of caudal peduncle submarginally on lower lobe to posterior part of fin; pelvic fins pale blue anteriorly and yellowish hyaline to hyaline posteriorly; pectoral fins pinkish to yellowish hyaline.

Preserved coloration: head and body brown to dark

purplish brown, paler ventrally; dark grey stripe from anterior edge of eye to snout tip, including upper and lower lips; dark brown curved streak around posterior orbital rim; body scales with dusky basal spots, these becoming indistinct ventrally; dorsal and anal fins brownish hyaline to brown; caudal fin brown, abruptly hyaline to whitish on upper and lower margins; pectoral fins hyaline; pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis ransonneti* was previously known only from the vicinity of Singapore. Its range is here extended north to the Gulf of Thailand and south to the Seribu Ids, Indonesia (Figure 39). It has been collected from coral and rock reefs and rubble, usually in silty areas in lagoons, on fringing reefs and reef slopes at depths ranging from 1 to 20 m.

COMPARISONS: *Pseudochromis ransonneti* is a relatively distinctive species that is unlikely to be confused with other pseudochromines. The following character combination is diagnostic for the species: segmented dorsal-fin rays 23-24, usually 24; segmented anal-fin rays 13-14, usually 14; scales in lateral series 36-39; circumpeduncular scales 19-20; anal-fin spines relatively stout and pungent, the second much stouter than the third; and dorsal-fin origin to pelvic-fin origin 24.0-28.4 % SL.

REMARKS: *Pseudochromis ransonneti* is a moderate-sized species; the largest specimen examined measured 57.9 mm SL. Although the live coloration has not been previously illustrated, live coloration descriptions have been provided by Steindachner (1870) and Herre & Myers (1937).

ETYMOLOGY: The specific name is for Eugen Freihern von Ransonnet.

MATERIAL EXAMINED: GULF OF THAILAND, THAILAND: Ko I Lao, CAS 15261, 1(0), 40.7 mm SL; Parsho Bay, CAS 60877, 1(0), 41.6 mm SL; Khorn Aho Bay, 1(0), 36.7 mm SL; Ko Sak, CAS 60844, 9(0), 43.1-50.3 mm SL; Ko Martra, CAS 60971, 13(0), 28.5-48.2 mm SL; SE of Ban Pae Fisheries Station, CAS 60975, 6(0), 37.4-49.8 mm SL; Ko Samet, CAS 60974, 1(0), 46.3 mm SL, CAS 60983, 1(0), 35.9 mm SL; Klong Kul vicinity, CAS 60981, 1(0), 53.1 mm SL; Ko Krai , CAS 60986, 1(0), 38.7 mm SL; Ko Kawtain, CAS 60987, 4(0), 22.2-57.9 mm SL; Ko Lavahm, CAS 60989, 11(0), 29.8-52.0 mm SL; E side of Ko Kram, AMS I.31411-001, 9(9), 31.5-43.9 mm SL, AMS I.31554-001, 1(1), 39.6 mm SL (subsequently cleared and stained), CAS 60923, 11(0), 28.0-47.8 mm SL. SINGAPORE: BMNH 1895.1.8:18, 1(0), CAS 20005, 20(0), 29.9-47.5 mm SL, CAS-SU 30845, 1(0), 36.1 mm SL, MNHN 8619, 2(2), 42.1-43.7 mm SL (putative syntypes), NMW 76581:1-2, 2(2), 40.9-49.2 mm SL (syntypes); Singapore Harbour, AMS I.31424-001, 2(2), 40.6-40.7 mm SL, CAS-SU 30844, 6(6), 34.1-51.1 mm SL; Salu Id, BPBM 22057, 2(0), 29.0-43.0 mm SL. INDONESIA: Pulau Seribu, Pulau Pari Group, off W side of Pulau Tikus, USNM 278111, 2(2), 25.7-26.0 mm SL.

***Pseudochromis reticulatus* Gill & Woodland**
Reticulated Dottyback
Figures 30, 54

Pseudochromis reticulatus Gill and Woodland, 1992: 248, figs 1-2 (type locality: Glomar Shoal, Western Australia); Gill & Randall, 1998: 25 (comparison; distribution); Gill, 1999b: 2565 (key).

DIAGNOSIS: A species of *Pseudochromis* with the following combination of characters: segmented dorsal-fin rays 26-27, usually 26; segmented anal-fin rays 14-15, usually 15; circumpeduncular scales 16; dorsal-fin termination to anal-fin termination 14.7-16.2 % SL; caudal fin rounded in small (less than 35 mm SL) specimens, becoming pointed (rounded with middle rays produced) in larger specimens; and, in preservative, predorsal contour and nape pale pinkish brown, the dorsal contour of body and caudal peduncle with dark grey-brown reticulations surrounding pale spots.

DESCRIPTION (based on 12 specimens, 35.9-55.6 mm SL): dorsal-fin rays III,26-27, all segmented rays branched; anal-fin rays III,14-15, all segmented rays branched; pectoral-fin rays 17-19; upper procurrent caudal-fin rays 5-7; lower procurrent caudal-fin rays 5-6; total caudal-fin rays 27-30; scales in lateral series 33-38; anterior lateral-line scales 25-31; anterior lateral line terminating beneath segmented dorsal-fin ray 18-24; posterior lateral-line scales 6-11 + 0-1; scales between lateral lines 3; horizontal scale rows above anal-fin origin 12-14 + 1 + 2-3 = 15-18; circumpeduncular scales 16; predorsal scales 16-21; scales behind eye 2-4; scales to preopercular angle 4-6; gill rakers 5-7 + 12-13 = 17-19; pseudobranch filaments 8-11; circumorbital pores 18-29; preopercular pores 9-14; dentary pores 4; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from anterior AIO pores to posterior nasal pores; opercle with 4-7 irregular small to relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers well developed on raker tips only; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1 + 1*/1; dorsal-fin spines pungent and relatively stout; anterior anal-fin pterygiophore formula 3/1 + 1/1 + 1*/1/1 + 1*/1; anal-fin spines pungent and relatively stout, second spine varying from marginally stouter to much stouter than third; pelvic-fin spine pungent and moderately stout to stout; second segmented pelvic-fin ray longest; caudal fin rounded in small specimens, becoming pointed (rounded with middle rays produced) in larger specimens; vertebrae 10 + 16; epineurals 13-15; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 5-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-3 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw slightly larger and curved; vomer with 2 rows of small conical teeth, forming chevron; palatine with 2-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-

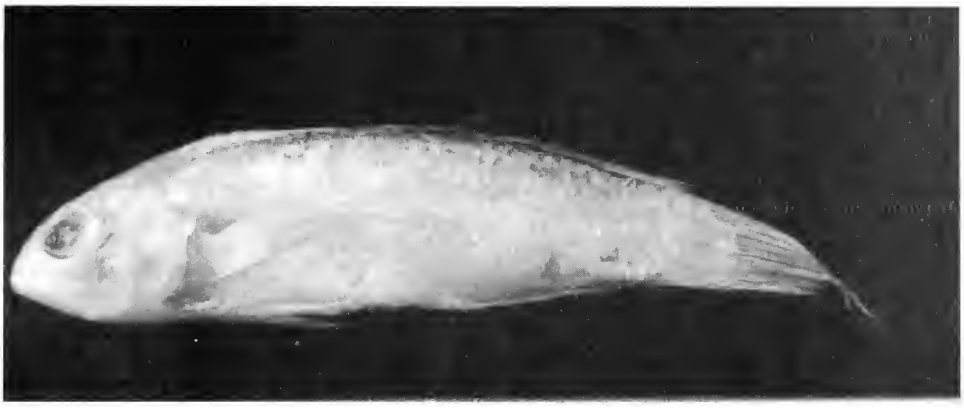

Figure 54. *Pseudochromis reticulatus*, NTM S.13331-010, 53.6 mm SL, E of Margaret Harries Banks, Northern Territory, Australia. (Photo by P. Crabb)

or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on seven specimens, 36.0-55.6 mm SL): head length 23.1-25.4; orbit diameter 8.8-10.6; snout length 5.8-6.7; fleshy interorbital width 4.9-5.7; bony interorbital width 3.6-4.0; body width 11.4-13.0; snout tip to posterior tip of retroarticular bone 13.9-15.0; predorsal length 30.8-34.7; prepelvic length 32.3-33.2; posterior tip of retroarticular bone to pelvic-fin origin 18.9-21.4; dorsal-fin origin to pelvic-fin origin 25.6-27.8; dorsal-fin origin to middle dorsal-fin ray 34.3-37.4; dorsal-fin origin to anal-fin origin 39.4-43.0; pelvic-fin origin to anal-fin origin 24.3-31.1; middle dorsal-fin ray to dorsal-fin termination 23.1-26.5; middle dorsal-fin ray to anal-fin origin 24.2-27.4; anal-fin origin to dorsal-fin termination 32.8-34.9; anal-fin base length 25.0-27.5; dorsal-fin termination to anal-fin termination 14.7-16.2; dorsal-fin termination to caudal peduncle dorsal edge 10.1-12.8; dorsal-fin termination to caudal peduncle ventral edge 17.5-18.8; anal-fin termination to caudal peduncle dorsal edge 18.3-20.5; anal-fin termination to caudal peduncle ventral edge 11.9-14.0; first dorsal-fin spine 2.7-3.6; second dorsal-fin spine 5.1-7.8; third dorsal-fin spine 7.7-10.0; first segmented dorsal-fin ray 11.8-13.5; fourth last segmented dorsal-fin ray 17.5-19.5; first anal-fin spine 2.0-3.3; second anal-fin spine 4.9-6.1; third anal-fin spine 6.5-9.2; first segmented anal-fin ray 11.0-13.1; fourth last segmented anal-fin ray 15.2-17.4; third pectoral-fin ray 14.0-15.8; pelvic-fin spine 9.9-12.1; second segmented pelvic-fin ray 22.6-29.2; caudal-fin length 29.4-51.1.

Live coloration: not known.

Preserved coloration: head and body pale pinkish brown becoming slightly darker posteriorly; scattered greyish pigment forming an indistinct stripe from behind eye to gill opening, this contacting less distinct short greyish brown curved marking that extends around posteroventral part of orbital rim; dorsal contour of caudal peduncle and body excluding predorsal contour and nape dark grey-brown; scales of dark area of body each with large pale basal spot, these forming in combination with background coloration dark reticulations; pale basal spots continuing onto pale part of body but becoming less distinct; dorsal fin white on spinous portion, dusky hyaline posteriorly; each interradial membrane behind second segmented ray with short dark grey-brown basal oblique stripe, these becoming indistinct posteriorly; anal fin dusky grey; caudal fin dusky brown with whitish upper and lower borders; pectoral and pelvic fins hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis reticulatus* is known only from Glomar Shoal, off northern Western Australia, and Evan's Shoal and Margaret Harries Banks, Timor Sea (Figure 30). All specimens were trawled in 79 to 82 m.

COMPARISONS: *Pseudochromis reticulatus* closely resembles *P. pictus* in most meristic and morphometric values and in preserved coloration. Characters distinguishing the two species are discussed under *Comparisons* for *P. pictus*.

REMARKS: *Pseudochromis reticulatus* is a moderately small species; the largest specimen examined measured 55.6 mm SL. Although the live coloration of the species is unknown, it is probably similar to *P. pictus*.

MATERIAL EXAMINED: NORTHERN TERRITORY, AUSTRALIA: E of Margaret Harries Banks, 10°20'S 129°06'E, NTM S.13331-010, 7(7), 36.0-55.6 mm SL; S of Evan's Shoal, 10°20'S 129°22'E, NTM S.13332-007, 4(4), 35.9-55.2 mm SL. WESTERN AUSTRALIA: Glomar Shoal (19°32'S 116°48'E), NTM S.10821-004, 1(1), 50.7 mm SL (holotype).

***Pseudochromis sankeyi* Lubbock**
Schooling Dottyback
Figure 42; Plate 11I

Pseudochromis sankeyi Lubbock, 1975: 145, pl. 2, fig. d (type locality: Massawa, Ethiopia, Red Sea); Randall, 1983: 60 (description and colour fig.); Debelius, 1984b: 427 (colour fig.); Debelius, 1986: 16 (colour fig.; specific name misspelt); Burgess et al., 1988: pl. 153 (colour fig.); Baensch & Debelius, 1992: 980 (distribution; colour fig.); Gill, 1993: 52 (colour fig.); Debelius, 1993: 115 (colour fig.); Goren & Dor, 1994: 28 (list); Lieske & Myers, 1994: pl. 32, fig. 4 (colour fig.; habitat and distribution); Randall, 1994: 272 (distribution); Debelius, 1996: 115 (colour fig.); Debelius, 1998: 69 (colour figs; habitat and distribution).

DIAGNOSIS: *Pseudochromis sankeyi* is distinguished from

all other pseudochromines in having 6-8 + 15-16 = 21-24 gill rakers and a shallow body (dorsal-fin origin to pelvic-fin origin 21.8-25.2 % SL) in combination with the following coloration: head and body pale pinkish to white, the dorsal contour dark olive to dark grey-brown with two broad black stripes, one extending from the snout tip through the eye and along the side of the body to the lower caudal rays on the upper hypural plate, and the other extending from the posterior part of the lower jaw to the mid-upper caudal rays on the lower hypural plate.

DESCRIPTION (based on 21 specimens, 20.1-56.1 mm SL): dorsal-fin rays III,26-28, last 1-27 segmented rays branched (all or all but first branched in specimens larger than 35 mm SL); anal-fin rays III,14-16, last 1-16 segmented rays branched (all or all but first 1-2 branched in specimens larger than 30 mm SL); pectoral-fin rays 16-17; upper procurrent caudal-fin rays 7-8; lower procurrent caudal-fin rays 7-8; total caudal-fin rays 31-33; scales in lateral series 38-46; anterior lateral-line scales 25-31; anterior lateral line terminating beneath segmented dorsal-fin ray 15-19; posterior lateral-line scales 0-10 + 0-2; scales between lateral lines 4-5; horizontal scale rows above anal-fin origin 14-16 + 1 + 2-3 = 17-20; circumpeduncular scales 19-20; predorsal scales 17-23; scales behind eye 3-4; scales to preopercular angle 4-6; gill rakers 6-8 + 15-16 = 21-24; pseudobranch filaments 7-10; circumorbital pores 14-42; preopercular pores 8-18; dentary pores 3-4; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from posterior AIO pores to midway between anterior AIO and posterior nasal pores; opercle with 3-7 usually well-developed serrations; teeth of outer ceratobranchial-1 gill rakers well developed and arranged in two rows running most of length of rakers (although moderately to weakly developed and intermittently spaced along rakers in specimens smaller than about 30 mm SL); anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1 + 1*/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1 + 1*/1; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine stout and pungent; second segmented pelvic-fin ray longest; caudal fin rounded with upper rays of lower lobe strongly produced; vertebrae 10 + 16; epineurals 14-16; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw slightly larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 13 specimens, 21.4-56.1 mm SL): head length 20.3-26.2; orbit diameter 6.8-11.2; snout length 4.6-5.6; fleshy interorbital width 4.8-6.1; bony interorbital width 3.3-4.7; body width 8.6-11.4; snout tip to posterior tip of retroarticular bone 11.6-14.5; predorsal length 28.0-35.5; prepelvic length 28.2-31.8; posterior tip of retroarticular bone to pelvic-fin origin 17.2-20.2; dorsal-fin origin to pelvic-fin origin 21.8-25.2; dorsal-fin origin to middle dorsal-fin ray 33.2-27.3; dorsal-fin origin to anal-fin origin 37.1-40.1; pelvic-fin origin to anal-fin origin 26.6-33.0; middle dorsal-fin ray to dorsal-fin termination 24.8-27.6; middle dorsal-fin ray to anal-fin origin 19.6-23.4; anal-fin origin to dorsal-fin termination 31.8-35.7; anal-fin base length 25.7-31.7; dorsal-fin termination to anal-fin termination 12.0-13.6; dorsal-fin termination to caudal peduncle dorsal edge 10.8-13.3; dorsal-fin termination to caudal peduncle ventral edge 17.1-20.0; anal-fin termination to caudal peduncle dorsal edge 18.2-20.6; anal-fin termination to caudal peduncle ventral edge 12.1-14.7; first dorsal-fin spine 0.7-2.3; second dorsal-fin spine 2.3-6.9; third dorsal-fin spine 6.4-10.3; first segmented dorsal-fin ray 9.8-13.3; fourth last segmented dorsal-fin ray 13.6-16.2; first anal-fin spine 1.4-2.9; second anal-fin spine 5.5-8.4; third anal-fin spine 5.6-8.4; first segmented anal-fin ray 8.6-11.4; fourth last segmented anal-fin ray 11.4-15.3; third pectoral-fin ray 11.3-14.3; pelvic-fin spine 7.0-13.6; second segmented pelvic-fin ray 15.3-18.8; caudal-fin length 21.6-32.4.

Live coloration (based on photographs of specimens from Massawa and Djibouti; Plate 111): dorsal contour of head and body dark olive to dark grey-brown; broad black stripe extending from snout tip through eye to tips of lower caudal fin rays on upper hypural plate, this bordered dorsally and sometimes ventrally by narrow pale pink to mauve stripe; large vertically-elongate dark blue spot on opercular flap; second median black stripe extending ventrally from posterior edge of lower jaw to mid-upper caudal fin rays on lower hypural plate; area between black stripes pale pinkish brown to white; iris pale pink dorsally and sometimes ventrally, remainder dark reddish grey to black with blue suboval ring around pupil; dorsal fin dark olive to dark grey-brown basally, remainder of fin greyish hyaline to hyaline with olive rays and narrow yellow distal margin; anal fin broadly black with narrow hyaline distal margin, hyaline area broadest anteriorly; caudal fin with black body stripes tapering to points posteriorly, area between stripes pale pinkish brown to white basally, becoming white posteriorly; area above upper stripe pinkish hyaline to hyaline, becoming yellowish hyaline to hyaline distally; area below lower stripe hyaline; pectoral fins hyaline; pelvic fins pale grey to hyaline, inner 2-3 rays grey to black.

Preserved coloration: pattern similar to live coloration, black markings remain; white, pale pink to mauve and pinkish brown areas becoming pale pinkish brown to white.

HABITAT AND DISTRIBUTION: *Pseudochromis sankeyi* was previously known from Massawa and the Dahlak Archipelago in the southern Red Sea, and from the Golfe de Tadjourah in the northern Gulf of Aden. Its range is extended to the Kamaran Ids, southern Red Sea, and along the Yemenese coast of the Gulf of Aden to Al Mukalla based on specimens and photographic and sight records made by J.M. Kemp and his colleagues (Figure 42). According to Lubbock (1975: 146), this species lives in loose schools (to 100 individuals) under ledges and in small caves on coral and rock reefs at depths ranging from 2 to 10 m.

COMPARISONS: This species differs from all other congeners except *P. fridmani* in having 25-28 segmented dorsal-fin rays, 14-16 segmented anal-fin rays, 38-46 scales in lateral series, 6-8 + 15-16 = 21-24 gill rakers, well-developed teeth on the ceratobranchial-1 outer rakers running most of the raker lengths, a dark spot on the opercular flap, a relatively shallow body (dorsal-fin origin to pelvic-fin origin 21.8-25.2 % SL), and a rounded caudal fin with the lower lobe produced. Characters distinguishing the two species are discussed under *Comparisons* for *P. fridmani*.

REMARKS: *Pseudochromis sankeyi* is a moderately small species; the largest specimen examined measured 56.1 mm SL. Colour illustrations of it are provided in Lubbock (1975), Randall (1983), Debelius (1984b, 1986, 1993, 1996, 1998), Burgess et al. (1988), Baensch & Debelius (1992) and Gill (1993).

ETYMOLOGY: The specific name is for Richard D. Sankey, who provided Lubbock with the holotype.

MATERIAL EXAMINED: ERITREA, RED SEA: Massawa, BMNH 1973.12.20:104, 1(1), 55.5 mm SL (holotype); Dahlak Archipelago, SW shore of Sciumma Id, USNM 211774, 29(11, 21.4-42.8 mm SL), 18.8-42.8 mm SL (paratypes); Dahlak Archipelago, Harat Id, USNM 211772, 1(0), 43.4 mm SL (paratype); Dahlak Archipelago, Difnein Id, USNM 211773, 3(0), 20.8-25.1 mm SL (paratypes). YEMEN, RED SEA: Kamaran Ids, Uqban Id, SMF 28864, 7(0), 20.0-50.4 mm SL, SMF 28865, 2(0), 35.7-41.4 mm SL, SMF 28866, 3(0), 32.0-49.0 mm SL. DJIBOUTI, GOLFE DE TADJOURAH: MNHN 1977-733, 7(6, 20.1-46.6 mm SL), 13.4-46.6 mm SL (35.5 mm SL specimen subsequently cleared and stained); Seven Brothers (Sawabi) Ids, N side of Tolka Id (Ile Basse), BPBM 21562, 3(3), 35.0-56.1 mm SL (35.0 mm SL specimen subsequently cleared and stained).

Pseudochromis springeri Lubbock
Livid Dottyback
Figure 25; Plate 11J

Pseudochromis springeri Lubbock, 1975: 128, pl. 2, fig. a (type locality: El Himeira, Gulf of Aqaba); Randall, 1983: 60 (description and colour fig.); Debelius, 1984a: 119 (colour fig.; fig. inverted); Debelius, 1984b: 428 (colour fig.); Debelius, 1986: 16 (colour fig.); Debelius, 1987: 47 (colour fig.); Burgess et al., 1988: pl. 153 (colour fig.); Giovanetti, 1989: 76 (aquarium notes; colour fig.); Michael, 1990a: 9 (colour fig.); Michael, 1990b: 16 (aquarium notes); Baensch & Debelius, 1992: 984 (distribution; aquarium notes; colour fig.); Gill, 1993: 48 (colour fig.); Fosså & Nilsen, 1993: 132 (habitat and distribution; aquarium notes; colour fig.); Masuda & Allen, 1993: 130, fig. B (colour fig.); Debelius, 1993: 115 (habitat and distribution; colour fig.); Goren & Dor, 1994: 28 (list); Lieske & Myers, 1994: pl. 32, fig. 1 (colour fig.; habitat and distribution); Göthel, 1994: 105 (colour fig.; habitat & distribution); Debelius, 1996: 115 (colour fig.); Field & Field, 1998: 80 (colour fig.); Debelius, 1998: 68 (colour figs; habitat and distribution).

DIAGNOSIS: *Pseudochromis springeri* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 28-31, with the last 4-9 rays branched; segmented anal-fin rays 17-19; anterior lateral-line scales 15-25; and circumorbital pores 12-15.

DESCRIPTION (based on 21 specimens, 25.1-37.5 mm SL): dorsal-fin rays III,28-31, last 4-9 segmented rays branched; anal-fin rays III,17-19, last 5-14 segmented rays branched; pectoral-fin rays 16-18; upper procurrent caudal-fin rays 7-8; lower procurrent caudal-fin rays 7-8; total caudal-fin rays 31-33; scales in lateral series 35-42; anterior lateral-line scales 15-25; anterior lateral line terminating beneath segmented dorsal-fin ray 10-16; posterior lateral-line scales 0-6 + 0; scales between lateral lines 4-6; horizontal scale rows above anal-fin origin 11-14 + 1 + 2-5 = 15-20; circumpeduncular scales 20-21; predorsal scales 21-30; scales behind eye 3-4; scales to preopercular angle 4-6; gill rakers 4-6 + 12-14 = 17-20; pseudobranch filaments 7-9; circumorbital pores 12-15; preopercular pores 7-10; dentary pores 4; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although often with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from mid AIO pores to midway between anterior AIO and posterior nasal pores; opercle with 4-6, usually relatively distinct serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or with well-developed teeth confined to raker tips, although sometimes with moderately-developed teeth running most of length of rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1 + 1/1; dorsal-fin spines moderately stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1 + 1*/1/1 + 1*/1; anal-fin spines moderately stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout and pungent; second or third segmented pelvic-fin ray longest; caudal fin rounded, usually with lower lobe produced; vertebrae 10 + 16; epineurals 15-16; epurals 3.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 5-7 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw slightly larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 14 specimens, 25.1-37.5 mm SL): head length 23.1-27.5; orbit diameter 8.1-10.5; snout length 5.4-6.4; fleshy interorbital width 5.7-7.0; bony interorbital width 3.1-4.3; body width 10.8-12.4; snout tip to posterior tip of retroarticular bone 13.1-15.1; predorsal length 30.4-34.5; prepelvic length 30.3-35.1; posterior tip of retroarticular bone to pelvic-fin origin 17.8-21.9; dorsal-fin origin to pelvic-fin origin 24.9-27.7; dorsal-fin origin to middle dorsal-fin ray 34.6-39.5; dorsal-fin origin to anal-fin origin 37.4-40.8; pelvic-fin origin to anal-fin origin 23.0-29.5; middle dorsal-fin ray to dorsal-fin termination 24.3-30.5; middle dorsal-fin ray to anal-

fin origin 25.5-28.3; anal-fin origin to dorsal-fin termination 38.0-41.4; anal-fin base length 31.3-35.8; dorsal-fin termination to anal-fin termination 13.6-16.0; dorsal-fin termination to caudal peduncle dorsal edge 6.9-9.1; dorsal-fin termination to caudal peduncle ventral edge 16.1-18.0; anal-fin termination to caudal peduncle dorsal edge 17.3-19.2; anal-fin termination to caudal peduncle ventral edge 8.2-9.7; first dorsal-fin spine 1.4-3.0; second dorsal-fin spine 3.3-5.5; third dorsal-fin spine 5.2-7.6; first segmented dorsal-fin ray 9.7-11.5; fourth last segmented dorsal-fin ray 16.7-24.4; first anal-fin spine 1.6-2.7; second anal-fin spine 3.2-5.4; third anal-fin spine 4.7-7.2; first segmented anal-fin ray 8.1-10.6; fourth last segmented anal-fin ray 11.3-19.0; third pectoral-fin ray 12.5-15.6; pelvic-fin spine 7.8-10.0; second segmented pelvic-fin ray 17.9-26.7; caudal-fin length 24.1-29.7.

Live coloration (based on photographs of specimens from the Gulf of Aqaba and northern Red Sea, field observations of individuals in the Strait of Tiran, Egypt, and notes taken from captive specimens; Plate 11J): head and body dark grey-brown to dark grey; black pigmentation surrounding sensory pores of head (including upper infraorbital, posterior otic, posterior preopercular, intertemporal, anterior temporal, lower supratemporal and posttemporal pores); large dark grey to black vertically-elongate spot on opercular flap, spot bordered posteriorly with gold; bright blue stripe extending from snout tip above eye and along horizontal portion of anterior lateral line to beneath anterior part of dorsal fin; second bright blue stripe extending from middle of lower lip below eye and below opercular flap spot to pectoral-fin base; iris dark orangish brown to black with oblique blue line above and below pupil; several to many scales body scales basally with dark grey to black vertically-elongate spots; dorsal fin dark greyish brown to black with reddish brown subdistal and bright blue distal margin; anterior part of fin sometimes with row of bright blue spots along middle of fin; anal fin dark greyish brown to black with reddish brown subdistal and bright blue distal margin; caudal fin dark greyish brown to black with bright blue upper and lower margins; pectoral fins pinkish hyaline to hyaline; pelvic fins pale grey to pinkish hyaline or hyaline.

Preserved coloration: pattern similar to live coloration, head and body becoming brown to dark brown; dark grey to black opercular flap spot, vertically-elongate scale spots and pigmentation surrounding head pores remain; bright blue stripes and fin markings becoming pale purplish grey; dorsal, anal and caudal fins otherwise becoming dark greyish brown to black; pectoral fins hyaline, grey basally; pelvic fins pale grey, posterior rays grey.

HABITAT AND DISTRIBUTION: *Pseudochromis springeri* is known only from the Red Sea, from the Gulf of Aqaba south to Jiddah and Port Sudan (Figure 25). It has been observed (Lubbock, 1975: 129; pers. obs.) and collected among branching corals (*Pocillopora, Seriatopora* and *Acropora*) at depths ranging from 2 to 60 m.

COMPARISONS: *Pseudochromis springeri* resembles *P. dutoiti* in having in life a gold-edged dark grey to black spot on the opercular flap, two bright blue stripes on the head, and black pigmentation surrounding the sensory pores of the head. Characters distinguishing the two species are discussed under *Comparisons* for *P. dutoiti*. The following combination of characters distinguishes *P. springeri* from all other pseudochromines: segmented dorsal-fin rays 28-31 with the last 4-9 branched; segmented anal-fin rays 17-19; anterior lateral-line scales 15-25; and circumorbital pores 12-15.

REMARKS: *Pseudochromis springeri* is a small species; the largest specimen examined measured 44.4 mm SL. Lubbock's (1975) colour illustration of the species shows the ground coloration to be dark green rather than dark grey-brown to dark grey. Based on the greenish cast on background items in the photograph, this appears to be a printing or lighting artifact. Good colour illustrations are provided, for example, in Randall (1983), Debelius (1986, 1993, 1996, 1998), Burgess et al. (1988, 1991), Giovanetti (1989), Baensch & Debelius (1992), Gill (1993), Masuda & Allen (1993), Fosså & Nilsen (1993), Göthel (1994) and Field & Field (1998).

ETYMOLOGY: The specific epithet is for Victor G. Springer of the Division of Fishes at the U.S. National Museum of Natural History, who provided Lubbock with the holotype and other Red Sea pseudochromid specimens.

MATERIAL EXAMINED: GULF OF AQABA: Bay at El Himira, USNM 21176, 1(1), 36.6 mm SL (holotype), USNM 211763, 40(18, 25.1-37.5 mm SL), 18.8-37.5 mm SL; Israel, Eilat, BPBM 13365, 1(0), 33.5 mm SL (paratype), SMF 12629, 1(0), 44.4 mm SL; Sharm el Moya, BPBM 18201, 2(2), 31.2-35.2 mm SL. SUDAN: Port Sudan, BMNH 1973.12.20.17-19, 3(0), 32.0-33.5 mm SL. SAUDI ARABIA: Jiddah, Al Korae, BMNH 1973.12.20.20, 1(0), 28.7 mm SL (paratype).

***Pseudochromis steenei* Gill & Randall**

Fiery Dottyback
Figure 44; Plates 12A-B

Pseudochromis quinquedentatus [*non* McCulloch, 1926]; Gloerfelt-Tarp & Kailola, 1984: 138 (colour fig.; NE of Lombok, Indonesia).

Pseudochromis moorei [*non* Fowler, 1931b]; Kuiter, 1992: 41, figs b and c (colour figs; sexual dimorphism).

Pseudochromis steenei Gill & Randall, 1992: 42, figs 1-4 (type locality: Tulamben, Bali, Indonesia); Lieske & Myers, 1994: pl. 32, fig. 11 (colour fig.; habitat and distribution); Kuiter & Debelius, 1994: 111, 114 (colour fig.; habitat and distribution); Allen, 1995: 84, figs 5-6 (comparison; colour figs); Allen, 1997: 96, pl. 29-11 (description; distribution; colour figs); Randall, 1998: 234, fig. 12 (colour fig.); Gill, 1999b: 2563 (key).

DIAGNOSIS: *Pseudochromis steenei* is distinguished from congeners in having the following combination of characters: palatine tooth patches inserted medially behind posterolateral arms of vomerine tooth patch; large dark grey spot at posterodorsal corner of operculum; anal fin with broad dark grey to black (dark grey-brown in preservative) distal stripe.

DESCRIPTION (based on six specimens, 54.0-76.5 mm SL): dorsal-fin rays III,25-26, all segmented rays branched; anal-fin rays III,14, all segmented rays branched; pectoral-fin rays 18-

19; upper procurrent caudal-fin rays 5-6; lower procurrent caudal-fin rays 5-6; total caudal-fin rays 27-29; scales in lateral series 40-45; anterior lateral-line scales 32-37; anterior lateral line terminating beneath segmented dorsal-fin ray 18-22; posterior lateral-line scales 6-15 + 0-2; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 13-15 + 1 + 3-4 = 17-19; circumpeduncular scales 20; predorsal scales 17-21; scales behind eye 3-4; scales to preopercular angle 6-8; gill rakers 5-8 + 11-12 = 17-20; pseudobranch filaments 13-17; circumorbital pores 26-35; preopercular pores 14-18; dentary pores 4; posterior interorbital pores 1-2.

Lower lip varying from incomplete with weak symphyseal interruption to complete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to mid AIO pores; opercle with 4-6 large, distinct serrations, with 0-3 additional smaller serrations below subopercle junction; teeth of outer ceratobranchial-1 gill rakers well developed only on distal halves or tips of rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1 + 1 or S/S/S + 3/1 + 1/1 + 1/1/1; dorsal-fin spines stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1/1 + 1; anal-fin spines stout and pungent, second spine stouter than third; pelvic fin spine stout and pungent; second pelvic fin segmented ray longer or subequal to third; caudal fin emarginate to strongly emarginate; vertebrae 10 + 16; epineurals 14-15; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth, and 4-6 (at symphysis) to 2-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-3 pairs of curved, caniniform teeth, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 2 rows of small conical teeth, forming chevron; palatine with 1-3 irregular rows of small conical teeth arranged in elongate patch, anterior tip of patch directed medially behind posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on five specimens, 54.0-76.5 mm SL): head length 23.3-25.4; orbit diameter 7.1-8.5; snout length 5.7-6.3; fleshy interorbital width 5.6-6.1; bony interorbital width 3.9-5.0; body width 13.0-13.9; snout tip to posterior tip of retroarticular bone 15.0-16.7; predorsal length 31.8-33.4; prepelvic length 31.8-32.0; posterior tip of retroarticular bone to pelvic-fin origin 17.0-19.1; dorsal-fin origin to pelvic-fin origin 29.2-31.9; dorsal-fin origin to middle dorsal-fin ray 33.9-36.2; dorsal-fin origin to anal-fin origin 42.0-44.8; pelvic-fin origin to anal-fin origin 28.9-33.0; middle dorsal-fin ray to dorsal-fin termination 25.7-27.2; middle dorsal-fin ray to anal-fin origin 26.2-28.3; anal-fin origin to dorsal-fin termination 33.3-35.6; anal-fin base length 24.6-28.5; dorsal-fin termination to anal-fin termination 16.7-18.2; dorsal-fin termination to caudal peduncle dorsal edge 10.3-11.7; dorsal-fin termination to caudal peduncle ventral edge 18.8-20.9; anal-fin termination to caudal peduncle dorsal edge 20.1-22.0; anal-fin termination to caudal peduncle ventral edge 10.8-12.6; first dorsal-fin spine 2.3-3.3; second dorsal-fin spine 5.2-6.5; third dorsal-fin spine 7.2-8.1; first segmented dorsal-fin ray 9.6-11.5; fourth last segmented dorsal-fin ray 12.8-16.4; first anal-fin spine 2.8-3.9; second anal-fin spine 5.6-6.8; third anal-fin spine 7.0-8.5; first segmented anal-fin ray 10.4-11.2; fourth last segmented anal-fin ray 15.4-16.6; third pectoral-fin ray 13.7-15.9; pelvic-fin spine 10.6-12.1; second segmented pelvic-fin ray 24.4-31.0; caudal-fin length 20.5-23.0.

Live coloration: Females (based on photographs of specimens from Komodo and Bali, Indonesia; Plate 12A): head and body grey to dark grey, darkest dorsally and on head; scales of dorsal half of head and body, and of anterior part of cheek each with dark grey to black basal spot; posterodorsal corner of operculum with large irregular dark grey to black spot; lower part of cheeks and anterior half of operculum grey to bright blue; dark grey curved bar along preopercular edge; snout, lips, orbital rim and suborbital region dark grey to black; bright bluish white to bright blue streak extending along posterior edge of eye to posterior edge of maxilla; iris dark reddish grey, becoming bright yellow to bright orange centrally, with bright blue suboval ring around pupil; caudal peduncle yellowish grey to bright yellow; dorsal fin greyish hyaline, darker grey basally, becoming orangish hyaline posteriorly, with one (anteriorly) to three (posteriorly) grey spots on middle of each interradial membrane, these forming indistinct broken stripes; broad dark grey to black stripe extending from dorsal-fin origin along distal edge of fin to about twentieth segmented fin ray; stripe edged distally with bright blue; anal fin greyish hyaline to pale grey, with broad dark grey to black distal stripe extending from fin origin to about tenth segmented ray; stripe edged distally with bright blue; caudal fin yellowish grey to bright yellow, becoming yellowish to greyish hyaline posteriorly; dorsal and ventral margins of caudal fin broadly bright yellow; pectoral fins greyish hyaline, becoming yellowish to orangish hyaline on outer edges of fin, with dark grey bar extending from pectoral-fin axil to base of middle rays; pelvic fins cream to pale orange, with distal half to two-thirds of fin in front of third segmented ray dark grey to black. Males (based on photographs of specimens from Bali, Lombok and Sumbawa, Indonesia; Plate 12B): head and anterior part of body bright yellow to bright orange, sometimes pinkish orange ventrally, remainder of body dark bluish grey; scales of dorsal half of head and body, and of anterior part of cheek each with purple to dark grey basal spot; posterodorsal corner of operculum with large irregular dusky grey spot; lower part of operculum broadly pinkish or bluish white anteriorly; dark grey curved bar along preopercular edge, this sometimes diffuse and irregularly broken into spots; snout and suborbital region greyish yellow to greyish orange; small dark grey to black spot in front of each anterior nostril; bright bluish white streak extending along posterior edge of maxilla, becoming diffuse and pale pink ventrally; iris bright orange, becoming bright yellow centrally, with bright blue suboval ring around pupil; distal third of dorsal fin and area in front of fourth to eighth segmented ray bright yellow to bright orange, remainder of fin bluish grey to dark purple; outer part of bluish grey to dark purple area of fin sometimes with one or two rows of horizontally elongate bright yellow to bright red spots, these most intense on posterior part of fin; distal margin of dorsal fin bright blue; anal fin greyish hyaline to pale grey with broad dark grey to black distal stripe extending from fin origin to about tenth segmented ray; stripe edged distally with bright blue; caudal fin bluish grey, becoming greyish hyaline

posteriorly; dorsal and ventral margins of caudal each with broad bright yellow to bright pink stripe, these edged proximally with dark purple to dark grey; pectoral fins pinkish to orangish hyaline; pelvic fins cream to pale orange, distal half to two-thirds of fin in front of third segmented ray dark grey to black.

Preserved coloration: Females: pattern similar to live coloration, head and body becoming dark brown; white markings on head becoming pale brown; dark grey to black markings on head, body and fins becoming dark grey-brown; yellow markings on caudal fin becoming pale yellow to pale brown. Males: pattern similar to live coloration, white, yellow, orange and pink markings on head, body and fins becoming pale yellow to pale brown; bluish grey and purple areas becoming dark brown; dark grey to black markings on head, body and fins becoming dark grey-brown.

HABITAT AND DISTRIBUTION: *Pseudochromis steenei* is known only from several Indonesian localities (Bali, Lombok, Sumbawa, Komodo and Alor; Figure 44). It has been observed (e.g., Gill & Randall, 1992; Kuiter & Debelius, 1994) and collected from isolated coral and rock patch reefs over silty sand slopes at depths ranging from 8 to 100 m. According to Kuiter (1992: 41) and Kuiter & Debelius (1994: 114) it is sometimes associated with crinoids and soft corals.

COMPARISONS: *Pseudochromis steenei* closely resembles *P. howsoni* from the North West Shelf of Australia, *P. moorei* from the Philippines and *P. quinquedentatus* from northern Australia in having medially inserted palatine tooth patches and in lacking a dark stripe on the dorsal part of the body. Characters distinguishing the four species are discussed under *Comparisons* for *P. howsoni*.

REMARKS: *Pseudochromis steenei* is a relatively large species; the largest examined specimen measured 76.5 mm SL. The sexual dimorphism noted above was determined from superficial examination of gonads of museum specimens and from field observations by various colleagues. Live colour photographs of males of the species have been published by Gloerfelt-Tarp & Kailola (1984 - as *P. quinquedentatus*), Kuiter (1992: fig. A - as *P. moorei*), Gill & Randall (1992: figs 1-2, 1994), Kuiter & Debelius (1994, 1997), Allen (1995: fig. 5) and Randall (1998), and live colour photographs of females have been published by Kuiter (1992: fig. B - as *P. moorei*), Gill & Randall (1992: figs 1-4; 1994), Kuiter & Debelius (1994, 1997) and Allen (1995: 84, fig. 6).

Gill & Randall (1992) partly distinguished *P. steenei* from *P. moorei* on the basis of ground coloration of the body (males orange anteriorly and grey posteriorly versus entirely orange) and caudal-fin and peduncle coloration (males with caudal fin grey centrally with orange to pink stripes dorsally and ventrally versus orange centrally, sometimes with broad dark grey stripes dorsally and ventrally; females with caudal peduncle and base of caudal fin yellowish grey to bright yellow with the dorsal and ventral margins of the fin bright yellow versus caudal peduncle and fin base dark grey with dorsal and ventral margins of fin dark grey). Kuiter & Debelius (1994: 114) noted that males of *P. steenei* may be entirely orange, sometimes with a yellow caudal fin, and that females may have a grey caudal fin. On the basis of this colour variation, they queried whether this species is distinct from *P. moorei*. However, other coloration characters, such as pelvic-, dorsal- and anal-fin coloration (see *Comparisons* for *P. howsoni*), clearly distinguish the two species.

ETYMOLOGY: The specific epithet is for Australian underwater naturalist and photographer Roger C. Steene.

MATERIAL EXAMINED: No locality data (aquarium trade specimen), BMNH 2000.5.16.3, 76.5 mm SL. INDONESIA: Bali, Tulamben, BPBM 34566, 1(1), 57.8 mm SL (holotype), USNM 321933, 1(1), 55.4 mm SL (paratype); NE of Lombok, NTM S.11035-001, 75.0 mm SL (paratype); SE of Sumbawa, NTM S.11336-002, 70.5 mm SL (paratype); Komodo Id, Turo Liu Point, BPBM 31982, 1(1), 54.0 mm SL (paratype).

***Pseudochromis striatus* Gill, Shao & Chen**
Striped Dottyback
Figure 38; Plate 12C

Pseudochromis striatus Gill, Shao & Chen, 1995: 79, fig. 1 (type locality: Batan Id, Philippines); Shibukawa & Iwata, 1997: 298, figs 1,2 (description; distribution; Ryukyu Ids); Gill, 1999b: 2565 (key).

DIAGNOSIS: *Pseudochromis striatus* is distinguished from congeners by the following combination of characters: segmented dorsal-fin rays 26, the last 7-8 branched; segmented anal-fin rays 15; circumpeduncular scales 14-16; horizontal scale rows above anal-fin origin 9-10 + 1 + 1-2 = 11-13; and a relatively shallow body (dorsal-fin origin to pelvic-fin origin 22.9-23.3 % SL). In combination, the presence of a dark grey to black sub-basal ovoid mark on the caudal fin and dark stripes on the body is also distinctive for the species.

DESCRIPTION (based on four specimens, 12.7-31.9 mm SL): dorsal-fin rays III,26, last 7-8 segmented rays branched; anal-fin rays III,15, last 6-9 segmented rays branched; pectoral-fin rays 17-18; upper procurrent caudal-fin rays 6; lower procurrent caudal-fin rays 6; total caudal-fin rays 29; scales in lateral series 35-37; anterior lateral-line scales 17-26; anterior lateral line terminating beneath segmented dorsal-fin ray 10-17; posterior lateral-line scales 0-6 + 0-1; scales between lateral lines 2-3; horizontal scale rows above anal-fin origin 9-10 + 1 + 1-2 = 11-13; circumpeduncular scales 14-16; predorsal scales 16-17; scales behind eye 2; scales to preopercular angle 3; gill rakers 3-4 + 9-11 = 13-15; pseudobranch filaments 8; circumorbital pores 10-22; preopercular pores 7-11; dentary pores 4; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without scale sheaths; predorsal scales extending anteriorly to anterior AIO pores; opercle with 3-5 irregularly-sized serrations; teeth of outer ceratobranchial-1 gill rakers well developed on raker tips only; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1 + 1*/1/1 + 1*/1 or S/S/S + 3 + 1/1/1/1/1/1/1 + 1/1/1; dorsal-fin spines moderately slender and pungent; anterior anal-fin pterygiophore formula 3/1/1 + 1/1/1 + 1/1 or 3/1 + 1/1/1 + 1/1/1; anal-fin spines stout and pungent, second spine much stouter than third; pelvic-fin spine moderately slender

and pungent; second segmented pelvic-fin ray longest; caudal fin rounded with truncate posterior margin; vertebrae 10 + 16; epineurals 13-14; epurals 3.

Upper jaw with 3-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 3-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw slightly larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on three specimens, 26.2-31.9 mm SL): head length 25.4-27.1; orbit diameter 9.7-11.4; snout length 5.6-6.1; fleshy interorbital width 5.0-5.7; bony interorbital width 3.7-3.8; body width 10.7-12.6; snout tip to posterior tip of retroarticular bone 12.9-13.7; predorsal length 31.3-33.6; prepelvic length 32.1-34.5; posterior tip of retroarticular bone to pelvic-fin origin 19.7-23.2; dorsal-fin origin to pelvic-fin origin 22.9-23.3; dorsal-fin origin to middle dorsal-fin ray 29.5-33.8; dorsal-fin origin to anal-fin origin 35.9-37.6; pelvic-fin origin to anal-fin origin 27.5-31.7; middle dorsal-fin ray to dorsal-fin termination 24.7-25.6; middle dorsal-fin ray to anal-fin origin 21.1-21.4; anal-fin origin to dorsal-fin termination 31.7-34.1; anal-fin base length 26.0-27.1; dorsal-fin termination to anal-fin termination 12.5-14.5; dorsal-fin termination to caudal peduncle dorsal edge 11.4-12.5; dorsal-fin termination to caudal peduncle ventral edge 16.3-18.3; anal-fin termination to caudal peduncle dorsal edge 17.9-19.5; anal-fin termination to caudal peduncle ventral edge 12.2-13.0; first dorsal-fin spine 1.3-1.5; second dorsal-fin spine 4.1-4.6; third dorsal-fin spine 6.1-6.9; first segmented dorsal-fin ray 9.5-11.0; fourth last segmented dorsal-fin ray 14.4-16.7; first anal-fin spine 1.9-2.3; second anal-fin spine 5.0-6.1; third anal-fin spine 6.0-7.6; first segmented anal-fin ray 10.0-10.3; fourth last segmented anal-fin ray 13.2-14.7; third pectoral-fin ray 13.7-15.4; pelvic-fin spine 9.4-9.5; second segmented pelvic-fin ray 18.2-19.8; caudal-fin length 21.3-23.7.

Live coloration (based on photographs of specimens from Taiwan and the Ryukyu Ids, and on description in Shibukawa & Iwata, 1997; Plate 12C): head and anterior part of body pinkish grey to reddish brown or orange, becoming pale yellowish brown to pinkish grey or olive-grey ventrally; remainder of body olive-grey to pinkish grey; orbital rim pale bluish grey to dark grey, this darkest on short vertical section of midposterior part of rim; lips reddish to yellowish orange; upper part of iris reddish brown to orange, remainder bluish to dark grey, with blue suboval ring around pupil; body scales behind pectoral-fin base each with dark grey stripe, these aligning along each horizontal scale row to form five to seven (posteriorly) to nine or ten (anteriorly) stripes; stripes tending to break into rows of spots on caudal peduncle; basal third of dorsal fin grey to pinkish grey, this bordered distally with dark grey stripe, which is in turn bordered distally by narrow bright yellow to orange stripe; distal half of fin pinkish to orangish hyaline or hyaline, with greyish margin; a narrow orange stripe sometimes present along distal quarter of fin; anal fin grey basally, becoming pinkish to yellowish hyaline or hyaline distally, sometimes with one or two indistinct, grey stripes on basal third of fin; distal third of anal fin sometimes with indistinct pale orange narrow stripe; caudal fin olive-grey on basal third, edged posteriorly with large black, sub-basal, ovoid spot; intermittent scales within olive-grey basal part of fin each with dark grey to black central spot; large, black ovoid spot on caudal fin edged posteriorly, ventrally and dorsally with pale orange to bright golden yellow convex bar, which extends from dorsal edge of caudal peduncle to ventral edge of caudal peduncle; distal half of caudal fin behind large black spot either hyaline to greyish hyaline with areas dorsal and ventral to greyish hyaline area yellowish hyaline; pectoral and pelvic fins hyaline to pinkish hyaline.

Preserved coloration: pattern similar to live coloration, head and breast becoming pale yellowish brown with remainder of body brown to olive or brownish grey; grey and black markings on head, body and fins remain, becoming dark brown to dark grey-brown or black; dorsal and anal fins dark grey on basal third to half of fins, remainder abruptly greyish hyaline to hyaline; caudal fin brown to greyish brown basally, becoming dark grey to black posteriorly in large ovoid mark on middle part of fin, this edged posteriorly with white, remainder of fin hyaline dorsally, becoming greyish hyaline ventrally; pectoral fins hyaline; pelvic fins greyish hyaline to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis striatus* was described by Gill et al. (1995) from the holotype and paratype from Batan Id, Batanes Province, Philippines and a paratype from Orchid Id, Taiwan. Shibukawa & Iwata (1997) extended its range to Ishigaki and Iriomote Ids in the Ryukyu Ids; J.T. Williams recently collected an additional specimen from Ishigaki Id (Figure 38). *Pseudochromis striatus* has been collected among corals and encrusted boulders in 9 to 37 m.

COMPARISONS: *Pseudochromis striatus* closely resembles *P. elongatus* in having 26 segmented dorsal-fin rays with most rays unbranched, 15 segmented anal-fin rays, 14-16 circumpeduncular scales, a relatively shallow body (dorsal-fin origin to pelvic-fin origin 22.9-23.3 % SL), and a large dark grey to black sub-basal ovoid mark on the caudal fin. Characters distinguishing the two species are discussed under *Comparisons* for *P. elongatus*.

REMARKS: The above description is based primarily on the 31.9 holotype, the 26.2 mm SL paratype and a 29.9 mm SL non-type (sex not determined). Owing to its small size, the 12.7 mm SL paratype lacks a full compliment of branched fin rays, head pores, predorsal scales and tubed lateral-line scales. Colour photographs of the species are provided by Gill et al. (1995) and on the cover of the January 1998 (vol. 9, no. 1) issue of *I.O.P. Diving News*.

Shibukawa & Iwata (1997) recently described six juvenile (14.7-22.3 mm SL) specimens of the species from the Ryukyu Ids. The specimens were not examined for the present study, but Shibukawa & Iwata's description agrees in all important details. The specimens extend our understanding of character variation for segmented dorsal-fin rays (one specimen with 25 versus 26 in other known specimens) and scales in lateral

series (five bilateral counts of 38). Other departures noted by Shibukawa & Iwata (e.g., branched fin rays, head pores, predorsal scales, tubed lateral-line scales and morphometrics) appear to be attributable to the small size of their specimens.

ETYMOLOGY: The specific epithet is from the Latin *stria*, a furrow or groove, and *atus*, pertaining to, with reference to the distinctive series of stripes on the body.

MATERIAL EXAMINED: JAPAN: Ryukyu lds, Ishigaki ld, Urasoka Bay (24°27'18"N 124°12'22"E), USNM 352601, 1(1), 29.9 mm SL. TAIWAN: Orchid ld, Yeh-Yiu, ASIZT P.57128, 1(1), 26.2 mm SL (paratype). PHILIPPINES: Batan Id, White Beach (20°24'45"N 121°55'00"E), USNM 291616, 1(1), 31.9 mm SL (holotype), USNM 304579, 1(1), 12.7 mm SL (paratype).

Pseudochromis tapeinosoma Bleeker
Horseshoe-tailed Dottyback
Figure 55; Plates 12D-E

Pseudochromis tapeinosoma Bleeker, 1853a: 115 (type locality: Amboina); Aoyagi, 1943: 106, pl. 33, fig. 1 (not pl. 25, fig. 2; description; distribution in part); Masuda et al., 1975: 225, fig. 53-h (description; distribution); Shen, 1984: fig. 291-5 (Taiwan); Hayashi, 1984: 139, pl. 126, fig. c (description; distribution); Myers, 1989: 114 (description; distribution); Gill, 1993: 46 (sexual dimorphism; distribution); Shao, 1994: 301, fig. 77-9 (description; colour fig.); Lieske & Myers, 1994: pl. 31, fig. 7 (colour fig.; habitat and distribution); Masuda & Kobayashi, 1994: 126, fig. 8 (colour fig.); Gill, 1995: 244 (identification of types and lectotype designation of *P. tapeinosoma* Bleeker), 246 (identification of types of *P. melanotaenia* Bleeker); Gill & Allen, 1996: 36, tab. 1, fig. 4 (comparison; colour fig.); Myers, 1999: 121, 297, (description; distribution; fig.); Gill, 1999b: 2564 (key).

Pseudochromis melanotaenia Bleeker, 1863: 273 (type locality: Atapupu, Timor); Aoyagi, 1941c: 48, pl. 4, fig. 3 (description; Ryukyu Ids; colour fig.); Aoyagi, 1943: 108, pl. 31 (not pl. 24), fig. 3 (description; Riu-Kiu lds; colour fig.); Burgess & Axelrod, 1974: figs 259 and 264 (Taiwan); Masuda et al., 1975: 225, fig. 53-i (description; distribution); Shen, 1984: fig. 291-6 (Taiwan); Hayashi, 1984: 140, pl. 126, fig. d (description; distribution); Burgess et al., 1988: pl. 153 (colour fig.); Myers, 1989: 274 (list; distribution); Masuda & Allen, 1993: 136, fig. A (colour fig.); Shao, 1994: 300, fig. 77-7 (description; colour fig.); Shao et al., 1994: 277 (list; Pescadores Ids).

Pseudochromis (Leptochromis) melanotaenia; Bleeker, 1875: 20, pl.1, fig.3 (description; Timor and Amboina); Bleeker, 1877: pl. 390, fig. 7.

Labracinus flavipinnis Seale, 1910: 530 (type locality: Zamboanga, Mindanao, Philippines).

Pseudochromis (Assiculus) flavipinnis; Fowler, 1931b: 22 (compilation); Herre, 1953: 372 (list).

Pseudochromis (Assiculus) melanotaenia; Fowler, 1931b: 23 (compilation).

Pseudochromis cyanotaenia [*non* Bleeker, 1857]; Masuda & Kobayashi, 1994: 126, fig. 7 (colour fig.).

DIAGNOSIS: *Pseudochromis tapeinosoma* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 21-23, usually 22; segmented anal-fin rays 12-14, usually 13; scales in lateral series 27-34, usually 29-32; anterior lateral-line scales 20-27, usually 23-25; and circumpeduncular scales 16; males with dark grey to black horseshoe-shaped mark on caudal fin; females with dark grey to black spot covering posttemporal pores.

DESCRIPTION (based on 88 specimens, 23.3-39.6 mm SL): dorsal-fin rays IlI, 21-23, all or all but first segmented rays branched; anal-fin rays III,12-14, all or all but first segmented rays branched; pectoral-fin rays 16-19; upper procurrent caudal-fin rays 6-9; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 29-32; scales in lateral series 27-34; anterior lateral-line scales 20-27; anterior lateral line terminating beneath segmented dorsal-fin ray 15-19; posterior lateral-line scales 4-11 + 0-2; scales between lateral lines 3-4; horizontal scale rows above anal-fin origin 10-12 + 1 + 1-3 = 12-15; circumpeduncular scales 16; predorsal scales 10-15; scales behind eye 2-3; scales to preopercular angle 3-4; gill rakers 3-5 + 10-11 = 13-16; pseudobranch filaments 7-9; circumorbital pores 16-30; preopercular pores 8-19; dentary pores 4-5; posterior interorbital pores 0-2.

Lower lip varying from incomplete with weak to moderate interruption to complete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from posterior AIO pores to posterior nasal pores; opercle with 2-8, usually relatively indistinct serrations; teeth of outer ceratobranchial-1 gill rakers usually either weakly developed or with well-developed teeth confined to raker tips, although sometimes with well-developed teeth running most of lengths of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1/1/1/1/1/1/1 + 1*/1/1/1 or S*/S/S + 3/1 + 1/1/1/1/1/1/1/1/1/1 + 1/1; dorsal-fin spines slender and weakly pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1/1 + 1*/1/1/1 + 1*; anal-fin spines slender and weakly pungent to flexible, second spine varying from about as stout to less stout than third; pelvic-fin spine slender and weakly pungent to flexible; second or third segmented pelvic-fin ray longest; caudal fin rounded, sometimes with posterior margin weakly rounded to truncate; vertebrae 10 + 16; epineurals 14-15; epurals 2.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 1-3 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 20 specimens, 23.3-39.6 mm SL): head length 23.4-27.5; orbit diameter 8.0-10.3; snout length 4.4-5.6; fleshy interorbital width 3.6-5.2; bony interorbital

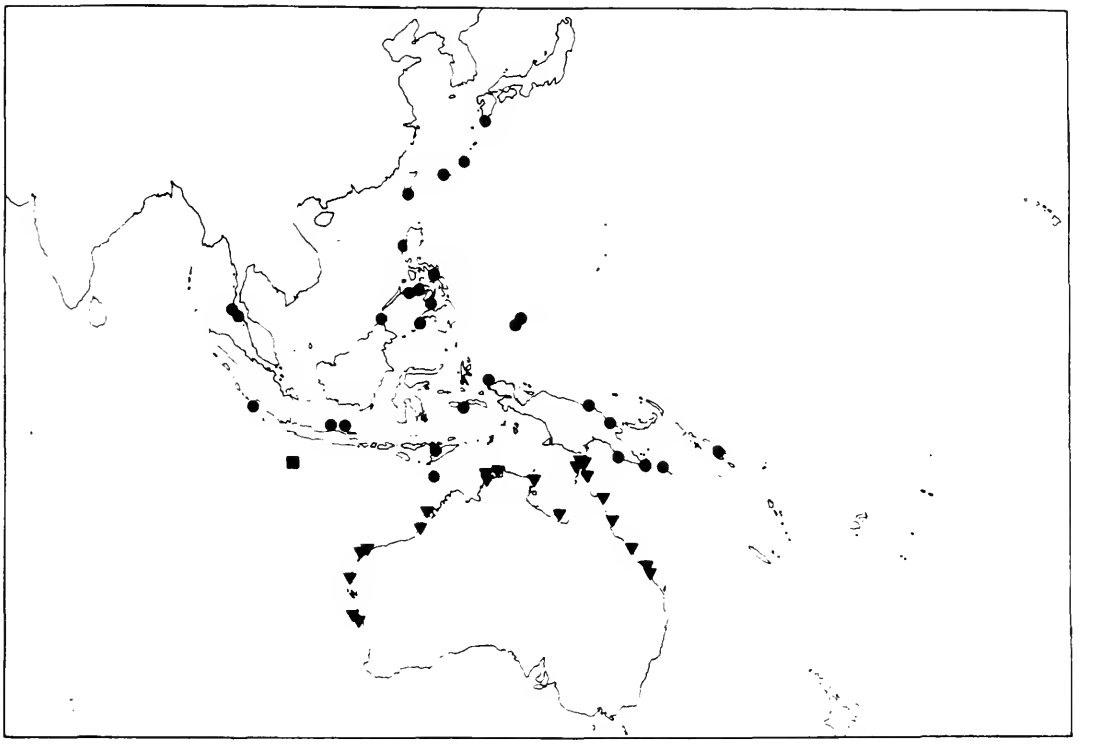

Figure 55. Distributional records for *Pseudochromis tapeinosoma* (closed circles), *P. viridis* (square) and *P. wilsoni* (triangles).

width 2.1-3.0; body width 11.1-13.1; snout tip to posterior tip of retroarticular bone 12.4-15.0; predorsal length 32.0-36.1; prepelvic length 30.0-32.6; posterior tip of retroarticular bone to pelvic-fin origin 17.0-19.5; dorsal-fin origin to pelvic-fin origin 24.9-28.0; dorsal-fin origin to middle dorsal-fin ray 25.6-32.9; dorsal-fin origin to anal-fin origin 37.5-40.7; pelvic-fin origin to anal-fin origin 25.3-33.2; middle dorsal-fin ray to dorsal-fin termination 24.2-29.2; middle dorsal-fin ray to anal-fin origin 24.1-27.0; anal-fin origin to dorsal-fin termination 31.5-35.7; anal-fin base length 22.9-27.8; dorsal-fin termination to anal-fin termination 15.2-19.7; dorsal-fin termination to caudal peduncle dorsal edge 12.3-14.1; dorsal-fin termination to caudal peduncle ventral edge 18.9-21.8; anal-fin termination to caudal peduncle dorsal edge 20.5-23.9; anal-fin termination to caudal peduncle ventral edge 14.3-16.7; first dorsal-fin spine 0.8-2.3; second dorsal-fin spine 3.1-6.1; third dorsal-fin spine 6.3-8.7; first segmented dorsal-fin ray 10.3-13.7; fourth last segmented dorsal-fin ray 14.7-18.9; first anal-fin spine 0.9-2.3; second anal-fin spine 3.1-5.2; third anal-fin spine 5.4-8.2; first segmented anal-fin ray 8.6-12.5; fourth last segmented anal-fin ray 14.7-18.5; third pectoral-fin ray 13.7-18.0; pelvic-fin spine 8.2-10.9; second segmented pelvic-fin ray 18.2-24.9; caudal-fin length 23.1-28.3.

Live coloration: Females (based on photographs of specimens from the Ryukyu Ids, Taiwan, the Andaman Sea, on description and figure provided by Aoyagi, 1943, and on field notes accompanying specimens from the Andaman Sea and Indonesia; Plate 12D): head and body grey or purplish blue to dark grey or dark grey-brown, becoming paler ventrally on head and breast; posttemporal pore patch dark grey to black; row of small white spots sometimes on interopercle and lower part of preopercle; iris pale greyish yellow to orange with blue suboval ring around pupil; dorsal and anal fins greyish hyaline to dark grey, usually darker basally; caudal fin greyish hyaline to dark grey, usually with upper and lower borders of fin abruptly paler, sometimes with basal portion reddish grey to red; pectoral fins hyaline; pelvic fins pale grey to greyish hyaline or hyaline. Males (based on description and figure provided by Aoyagi, 1943, and on photographs of specimens from the Ryukyu Ids, Taiwan, the Andaman Sea and Papua New Guinea; Plate 12E): head and body yellowish brown to yellow, darker dorsally; dorsal contour of head and nape dark grey to black, sometimes with blue tinges; posterior edge of orbit bright blue; iris bright yellow to bright red with bright blue to dark grey suboval ring around pupil; pectoral-fin base pinkish brown to yellow; scales of body sometimes each with pale yellowish brown to pale blue or grey central spot, these usually more apparent above anal-fin base; dorsal and sometimes ventral margin of caudal peduncle dark grey to black; dorsal fin bright yellow to yellowish hyaline, with narrow to broad (up to three-quarters fin height) dark grey to black stripe extending along base, middle or distal edge of fin; narrow reddish brown line usually present on anterior part of fin distal to dark stripe; second narrow reddish brown stripe sometimes along subdistal margin of fin; anal fin yellowish brown basally, becoming pinkish hyaline distally, with distal margin narrowly bluish hyaline; bluish hyaline portion of fin sometimes edged proximally by narrow reddish brown stripe; caudal fin bright yellow with dark grey to black markings extending from upper and lower edges of caudal peduncle subdistally onto fin, these joining posteriorly to form horseshoe-shaped marking; distal part of fin outside horseshoe-shaped mark yellowish hyaline, sometimes with narrow reddish brown line distally or subdistally on fin margin; pectoral fins yellowish brown to

yellow basally, remainder of fin yellowish hyaline; pelvic fins pinkish to yellowish hyaline.

Preserved coloration: Juveniles and females: head and body brown to dark grey, paler anteroventrally; posttemporal pore patch dark grey to black; dorsal and anal fins grey to brown, darker basally; dorsal fin sometimes with dark spots or lines on distal half of fin; caudal fin dark grey to dark brown; pectoral fins hyaline; pelvic fins pale grey or pale brown to hyaline. Males: pattern similar to live coloration, head and body becoming pale grey or pale brown to grey or brown, darker dorsally, with dark grey to black median predorsal blotches; posttemporal pore patch dark grey to black; blue spots and markings above anal-fin base sometimes remain, becoming pale grey to pale brown; dark stripe on dorsal fin remains, becoming dark grey-brown to black, remainder of fin pale brown to dark grey-brown; anal fin brownish hyaline to grey or brown; dark horseshoe-shaped mark on caudal fin remains, becoming dark greyish brown to black; remainder of fin greyish or brownish hyaline to grey or brown, paler distally; pectoral fins hyaline; pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis tapeinosoma* is relatively widely distributed throughout the east Indian and West Pacific Oceans, from the eastern Andaman Sea, east to the Solomon Ids, north to southern Japan, and south to the Timor Sea and Papua New Guinea (Figure 55). Records of this species from the central Indian Ocean, Australian coasts, Fiji and the central Pacific have been based variously on misidentified specimens of *P. coccinicauda, P. cyanotaenia, P. melanurus, P. viridis* and *P. wilsoni*. It has been collected primarily from shallow coral and rock reefs in lagoons, tidal pools and reef flats, often in relatively silty areas, at depths ranging to 12 m.

COMPARISONS: This species closely resembles and has been previously confused with *P. coccinicauda* (from the eastern and central Indian Ocean), *P. cyanotaenia* (from the eastern Indian Ocean and West Pacific, east to the Gilbert Ids), *P. melanurus* (from Tonga and Fiji) and *P. viridis* (from Christmas Id, Indian Ocean) in having relatively low segmented dorsal- and segmented anal-fin ray counts (modally 22 and 13, respectively), 16 circumpeduncular scales, and only two epurals. Characters distinguishing the five species are discussed under *Comparisons* for *P. coccinicauda* (see also Gill & Allen, 1996: 36, tab. 1).

REMARKS: *Pseudochromis tapeinosoma* is a small species; the largest specimen examined measured 39.6 mm SL. The sexual dimorphism described above was determined from a superficial examination of gonads. Some large female specimens resembled males in having a weak horseshoe-shaped marking on the caudal fin. This, in combination with the observation that all small specimens exhibited the female coloration, suggests that the species may be a protogynous hermaphrodite. Colour illustrations of females of the species are given in Aoyagi (1943: pl. 33, fig. 1), Masuda et al. (1975: fig. 53-h), Shen (1984: fig. 291-5), Hayashi (1984: pl. 126, fig. c) and Masuda & Kobayashi (1994: 126, fig. 7 - misidentified as *P. cyanotaenia*), and illustrations of males are given in Aoyagi (1943: pl. 31, fig. 3), Burgess & Axelrod (1974), Masuda et al. (1975: fig. 53-1), Shen (1984: fig. 291-6), Hayashi (1984: pl. 126, fig. d), Burgess et al. (1988), Masuda & Allen (1993), Shao (1994) and Masuda & Kobayashi (1994: 126, fig. 8).

The descriptions of *P. tapeinosoma* Bleeker (1853a) and *P. melanotaenia* Bleeker (1863) are based on females and a male of the present species, respectively. Although the latter name has been correctly applied, females of *P. cyanotaenia, P. coccinicauda, P. luteus, P. melanurus, P. tapeinosoma, P. viridis* and *P. wilsoni* have been confused under the former name. The identities of the primary type specimens of Bleeker's *P. tapeinosoma* and *P. melanotaenia* were discussed by Gill (1995), who designated a lectotype for the former species.

The holotype of Seale's (1910) *Labracinus flavipinnis* was deposited in the Philippine Bureau of Science and was destroyed during World War II (Herre, 1953: 2); however, the original description is clearly based on the present species.

ETYMOLOGY: The specific epithet is from the Greek *tapeinos*, low or humble, and *soma*, body, with apparent reference to the relatively slender body.

MATERIAL EXAMINED: THAILAND: Andaman Sea, Similan Ids, ROM uncat., 6(0), 22.0-34.0 mm SL; Andaman Sea, Similan Ids, Ko Miang, BPBM 35014, 7(7), 23.9-39.0 mm SL; Andaman Sea, Similan Ids, Ko Huyong, USNM 290457, 3(0); Andaman Sea, W side of S lagoon of Ko Pipidon, CAS 61001, 1(1), 32.3 mm SL. JAPAN: Ryukyu Ids, YCM P.6887, 1(1) 34.4 mm SL, YCM P.15985, 1(1), 37.2 mm SL, YCM P.15986, 1(1), 38.7 mm SL; Ryukyu Ids, Kuroshima, YCM P.19487, 1(1), 23.0 mm SL; Ryukyu Ids, Okinawa, Kimpau wan, USNM 132759, 8(0); Ryukyu Ids, Ishigaki Id, Kabira Bay, YCM P.4135, 1(0), 31.5 mm SL, YCM P.6466, 1(1), 25.2 mm SL, YCM P.2699, 1(0), 31.5 mm SL; Ryukyu Ids, Taketomi Id, Kaiji Beach, YCM P.2920, 1(0), 32.5 mm SL. TAIWAN: Wan-Li-Tung, NTUM 3755, 1(1); S end of Truan-Fan-Shih, BPBM 23353, 2(2), 35.9-37.7 mm SL; bay SE of K'en-Ting, USNM 290105, 9(7, 36.6-39.6 mm SL), 32.5-39.6 mm SL. PHILIPPINES: Luzon, NE of Bolinao, Santiago Id, AMS I.21903-053, 1(1), 28.8 mm SL; Luzon, Bolinao lagoon, USNM 232039, 2(2), 28.0-31.2 mm SL; Luzon, Gubat Bay, USNM 122899, 6(0); Cuyo Ids, Bararin Id, USNM 290714, 5(0); Cuyo Ids, Cocoro Id, USNM 290824, 13(0); Panay, AMS I.31425-001, 7(0), 24.0-32.0 mm SL, AMS I.31550-001, 1(1), 31.0 mm SL (subsequently cleared and stained), CAS-SU 51520, 9(0); Balabac Strait, USNM 83195, 1(0); Negros, near Maloh, USNM 290344, 11(0), USNM 290348, 8(0). INDONESIA: Mantawai Ids, Mega Id, USNM 290186, 1(1), 31.4 mm SL; Karimundjawa Ids, Mendjangan Id, USNM 278127, 1(0); Bawean Id, near E shore of first bay W of Sangkapura, USNM 278144, 11(11), 23.3-38.9 mm SL, USNM 290512, 35(3, 28.8-32.0 mm SL); Bali, Sanur Beach, NTM S.11203-048), 1(1), 36.0 mm SL; Waigeo Id, AMS I.31422-001, 2(2), 27.0-32.0 mm SL, CAS-SU 28053, 8(8), 32.0-38.9 mm SL; Ambon (Amboina), RMNH 5960, 1(1), 30.7 (lectotype of *P. tapeinosoma* Bleeker), RMNH 32434, 1(1), 42.5 mm SL (paralectotype of *P. tapeinosoma* Bleeker); RMNH 31182, 1(1), 29.8 mm SL; Ambon, off Tandjung Suli, USNM 220413, 4(4), 28.7-31.4 mm SL; Timor, Atapupu, RMNH 5963, 1(1), 33.7 mm SL (holotype of *P. melanotaenia* Bleeker). AUSTRALIA: Timor Sea, Ashmore Reef, West Id, WAM P.29042-024, 15(13, 24.9-34.1 mm SL), 24.9-34.1 mm SL. BELAU: Kayoungel Id, Ngajangel Islet, AMS I.31413-001, 2(2), 27.0-

32.0 mm SL, AMS I.31551-001, 1(1), 28.2 mm SL (subsequently cleared and stained), CAS 60944, 4(4), 26.8-32.1 mm SL; Koror Id, USNM 154394, 1(0). PAPUA NEW GUINEA: Mushu Id, USNM 246235, 1(0); Madang, WAM P.29624-045, 6(6), 28.0-34.0 mm SL; Port Moresby, Lolorua Id, USNM 246213, 7(0); Samarai district, 10°37'S 150°40E, AMS IA.5777, 1(1), 32.0 mm SL; Louisade Archipelago, Deboyne Ids, Panapompom Id, USNM 246222, 1(0). SOLOMON IDS: Guadalcanal, 12 km W of Honiara, AMS I.21972-001, 1(1), 29.8 mm SL.

***Pseudochromis tauberae* Lubbock**
African Dottyback
Figure 40; Plates 12F-G

Pseudochromis tauberae Lubbock, 1977: 9, pls 2A, 3C and 3D (type locality: Shanzu, Kenya); Bauchot & Desoutter, 1986: 8 (list).

DIAGNOSIS: *Pseudochromis tauberae* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 28-30, usually 29; segmented anal-fin rays 15-17, usually 16; scales in lateral series 37-44, usually 40-42; anterior lateral-line scales 28-37; circumpeduncular scales 18-21; and neither opercular flap nor anterior part of opercle with large dark spot.

DESCRIPTION (based on 33 specimens, 21.6-63.4 mm SL): dorsal-fin rays III,28-30, last 5-30 segmented rays branched (all or all but first 1-3 branched in specimens larger than about 40 mm SL); anal-fin rays III,15-17, last 8-17 segmented rays branched (all branched in specimens larger than about 35 mm SL); pectoral-fin rays 18-19; upper procurrent caudal-fin rays 7-8; lower procurrent caudal-fin rays 6-8; total caudal-fin rays 30-33; scales in lateral series 37-44; anterior lateral-line scales 28-37; anterior lateral line terminating beneath segmented dorsal-fin ray 19-25; posterior lateral-line scales 4-12 + 0-3; scales between lateral lines 3-5; horizontal scale rows above anal-fin origin 13-15 + 1 + 2-4 = 17-20; circumpeduncular scales 18-21; predorsal scales 16-22; scales behind eye 2-4; scales to preopercular angle 3-4; gill rakers 4-6 + 11-13 = 15-18; pseudobranch filaments 8-11; circumorbital pores 24-63; preopercular pores 9-32; dentary pores 4; posterior interorbital pores 1-2.

Lower lip incomplete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from mid AIO pores to posterior nasal pores; opercle with 3-6 moderate-sized serrations; teeth of outer ceratobranchial-1 gill rakers well developed mainly on raker tips only, although sometimes with well-developed teeth running most of length of upper few rakers; anterior dorsal-fin pterygiophore formula S*/S/S + 3/1 + 1/1 + 1*/1/1; dorsal-fin spines moderately stout to stout and pungent; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1*/1; anal-fin spines moderately stout and pungent, second spine much stouter than third; pelvic-fin spine moderately stout to stout and pungent; second segmented pelvic-fin ray usually longest, although sometimes slightly shorter than third; caudal fin rounded, usually with posterior margin weakly rounded to truncate; vertebrae 10 + 16; epineurals 13-15; epurals 3.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 54-6 (at symphysis) to 1-2 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 1-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-2 rows of small conical teeth, forming chevron; palatine with 2-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 17 specimens, 25.0-63.4 mm SL): head length 21.6-28.8; orbit diameter 7.4-11.1; snout length 5.4-6.5; fleshy interorbital width 4.7-5.6; bony interorbital width 2.8-3.9; body width 10.8-12.9; snout tip to posterior tip of retroarticular bone 12.6-15.6; predorsal length 30.1-36.5; prepelvic length 29.4-35.2; posterior tip of retroarticular bone to pelvic-fin origin 16.6-22.0; dorsal-fin origin to pelvic-fin origin 26.1-30.7; dorsal-fin origin to middle dorsal-fin ray 31.0-38.7; dorsal-fin origin to anal-fin origin 38.3-46.6; pelvic-fin origin to anal-fin origin 27.6-33.6; middle dorsal-fin ray to dorsal-fin termination 23.4-28.5; middle dorsal-fin ray to anal-fin origin 24.6-29.1; anal-fin origin to dorsal-fin termination 33.2-38.0; anal-fin base length 25.2-30.7; dorsal-fin termination to anal-fin termination 12.5-16.3; dorsal-fin termination to caudal peduncle dorsal edge 9.9-12.7; dorsal-fin termination to caudal peduncle ventral edge 17.2-19.9; anal-fin termination to caudal peduncle dorsal edge 18.3-20.8; anal-fin termination to caudal peduncle ventral edge 11.2-14.2; first dorsal-fin spine 1.8-3.1; second dorsal-fin spine 4.2-7.3; third dorsal-fin spine 6.2-9.9; first segmented dorsal-fin ray 10.6-13.8; fourth last segmented dorsal-fin ray 14.8-17.6; first anal-fin spine 1.9-3.4; second anal-fin spine 5.0-8.0; third anal-fin spine 6.6-8.6; first segmented anal-fin ray 9.7-12.0; fourth last segmented anal-fin ray 14.0-16.9; third pectoral-fin ray 14.2-17.3; pelvic-fin spine 8.5-11.1; second segmented pelvic-fin ray 19.2-23.1; caudal-fin length 23.7-29.3.

Live coloration (based on photographs of specimens from the Comores Ids and Kenya; Plates 12F-G): head and body dark olive to reddish grey, darker dorsally, becoming red to yellow ventrally on abdomen and lower part of head; posteroventral part orbital rim dark grey to bright red, this edged posteriorly with bright blue; iris orange to bright red with bright blue suboval ring around pupil; scales of dorsal and sometimes ventral part of flanks each with dark olive to dark blue central spot, sometimes replaced ventrally by red spots; dorsal and anal fins light bluish or pinkish grey to dark reddish grey with blue distal margin and sometimes red subdistal margin, basal part of fins usually darker than remainder of fins; dorsal and anal fins with about three to six horizontal rows of bright red spots; caudal fin reddish purple to dark bluish grey or dark grey, becoming light grey or hyaline to bright yellow posteriorly, sometimes with vertical rows of small red spots on posterior part of fin; upper and lower margins of caudal fin abruptly light grey to hyaline; pectoral and pelvic fins pinkish to yellowish hyaline.

Preserved coloration: pattern similar to live coloration, head and body brown to dark greyish brown, paler ventrally; bright

blue area around posteroventral rim of orbit becoming dark brown to black; scales of anterior part of body usually with dark margins and pale centres; dorsal and anal fins becoming light brown to dark brown, usually darker basally, bright red spots and subdistal margins becoming pale brown; caudal fin light to dark brown, pale brown to hyaline on upper and lower margins, sometimes with dusky grey to brown oblique proximal stripes lining pale to hyaline margins; pectoral fins hyaline; pelvic fins pale brown to hyaline.

HABITAT AND DISTRIBUTION: *Pseudochromis tauberae* is known only from the east coast of Africa (from Kenya south to Mozambique), the Comores Ids and Madagascar (Figure 40). Smith's (1980, 1986) records of this species from South Africa are based on *P. kristinae*. *Pseudochromis tauberae* has been observed (Lubbock, 1977) and collected from shallow lagoonal and fringing reefs at depths ranging from 0 to 6 m.

COMPARISONS: This species closely resembles *P. kristinae, P. madagascariensis* and *P. natalensis*; characters distinguishing the five species are discussed under *Comparisons* for *P. kristinae*.

REMARKS: *Pseudochromis tauberae* is a moderate-sized species; the largest specimen examined measured 63.4 mm SL. Colour illustrations of it are provided in Lubbock (1977).

ETYMOLOGY: The specific epithet is for Ruth Tauber.

MATERIAL EXAMINED: KENYA: Shanzu, BMNH 1975.2.12.10, 1(1), 63.4 mm SL (holotype), BMNH 1975.2.12.11-12, 2(2), 52.2-56.6 mm SL; Kikambala, BPBM 18035, 1(1), 45.3 mm SL (paratype); Shimoni, RUSI 28577, 1(0), 54.5 mm SL. TANZANIA: Zanzibar, RUSI 3633, 8(7, 45.4-51.3 mm SL; 46.3 mm SL specimen subsequently cleared and stained), 43.0-51.3 mm SL; Mafia Id, RUSI 48826 [in part; tag "Mafia"], 1(0). MOZAMBIQUE: Cape Delgado, RUSI 3608, 1(0), 45.5 mm SL; Tecomaji Id, RUSI 48826 [in part; tags "3/8/57" and "3/8/51"], 3(0); Ibo, SMF 12658, 1(1), 54.5 mm SL; Baixo Pinda, SMF 12988, 1(1),48.6 mm SL. COMORES IDS: ROM uncat., 28(0), 18.0-55.0 mm SL; Pamanzi Id, ANSP 158208, 1(1), 50.8 mm SL; N coast of Isle Malandyamiayatsini near eastern tip (12°40'19"S 44°03'27"E), ROM 72060, 28(12, 25.0-51.8 mm SL), 13.2-51.8 mm SL. MADAGASCAR: MNHN 1965-225, 2(2), 21.6-50.3 mm SL; Nossi-Bé, Ambariobe Bay, USNM 212280, 1(1), 35.2 mm SL; Nossi Bé, barrier reef off Nosi N'Tanga, USNM 212279, 3(3), 28.7-45.3 mm SL; Nossi Bé, Andilana Beach, AMS I.28113-062, 5(2, 52.7-59.8 mm SL; 52.7 mm SL specimen subsequently cleared and stained), 19.0-59.8 mm SL, CAS 66588, 1(0), 56.0 mm SL; Tuléar, MNHN 1965-382, 5(1, 63.4 mm SL), 40.7-63.4 mm SL (paratypes).

Pseudochromis viridis Gill & Allen
Green Dottyback
Figure 55; Plate 12H

Pseudochromis tapeinosoma [*non* Bleeker, 1853a]; Allen & Steene, 1979: 26 (Christmas Id, Indian Ocean); Allen & Steene, 1988: 180 (list; Christmas Id, Indian Ocean).
Pseudochromis viridis Gill & Allen, 1996: 34, fig. 1 (type locality: Christmas Id, Indian Ocean).

DIAGNOSIS: *Pseudochromis viridis* is distinguished from congeners in having the following combination of characters: dorsal-fin rays III,22, all segmented rays branched; anal-fin rays III, 13; fin spines slender and weakly pungent to flexible; scales in lateral series 33-37; circumpeduncular scales 16; and male coloration more-or-less uniformly bright yellowish olive.

DESCRIPTION (based on four specimens, 25.5-41.1 mm SL): dorsal-fin rays III,22, all segmented rays branched; anal-fin rays III,13, all segmented rays branched; pectoral-fin rays 17-19; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 29-31; scales in lateral series 33-37; anterior lateral-line scales 26-30; anterior lateral line terminating beneath segmented dorsal-fin ray 18-19; posterior lateral-line scales 7-9 + 0-1; scales between lateral lines 2-3; horizontal scale rows above anal-fin origin 11-12 + 1 + 2-3 = 14-15; circumpeduncular scales 16; predorsal scales 13-15; scales behind eye 2; scales to preopercular angle 3-4; gill rakers 4 + 10 = 14; pseudobranch filaments 7-10; circumorbital pores 27-57; preopercular pores 11-21; dentary pores 4; posterior interorbital pores 0-3.

Lower lip varying from incomplete with weak interruption to complete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from mid AIO pores to midway between anterior AIO and posterior nasal pores; opercle with 5-8 small, relatively indistinct serrations; teeth of outer ceratobranchial-1 gill rakers weakly developed or with well developed teeth confined to tips of rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1/1/1/1/1/1/1 + 1*/1/1 or S/S/S + 3/1 + 1/1/1/1/1/1/1/1/ 1/1 + 1; dorsal-fin spines slender and weakly pungent to flexible; anterior anal-fin pterygiophore formula 3/1 + 1/1/1 + 1/1/1 + 1; anal-fin spines slender and weakly pungent to flexible, third spine varying from about as stout to stouter than third spine; pelvic-fin spine slender and weakly pungent to flexible; second or third segmented pelvic-fin ray longest; caudal fin rounded with posterior margin slightly rounded to truncate; vertebrae 10 + 16; epineurals 15; epurals 2.

Upper jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 4-5 (at symphysis) to 1-2 (on sides of jaw) irregular inner rows of small conical teeth, outermost row of conical teeth largest; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth, inner pair smallest, and 5-6 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, conical teeth increasing in size and becoming more curved on middle part of jaw; vomer with 1-2 irregular rows of small conieal teeth arranged in chevron; palatine with 1-4 irregular rows of small conical teeth arranged in ovoid patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue weakly pointed to rounded and edentate.

As percentage of SL: head length 24.1-27.1; orbit diameter 9.6-11.4; snout length 5.1-5.9; fleshy interorbital width 3.9-4.6; bony interorbital width 2.6-2.8; body width 11.7-13.8; snout tip to posterior tip of retroarticular bone 11.9-14.1; predorsal length 32.2-34.9; prepelvic length 29.7-33.6; posterior tip of retroarticular bone to pelvic-fin origin 17.8-19.7; dorsal-fin

origin to pelvic-fin origin 25.6-27.5; dorsal-fin origin to middle dorsal-fin ray 23.1-25.3; dorsal-fin origin to anal-fin origin 37.7-39.7; pelvic-fin origin to anal-fin origin 27.1-32.2; middle dorsal-fin ray to dorsal-fin termination 23.9-27.0; middle dorsal-fin ray to anal-fin origin 23.1-25.3; anal-fin origin to dorsal-fin termination 31.8-33.6; anal-fin base length 22.0-24.6; dorsal-fin termination to anal-fin termination 15.9-17.6; dorsal-fin termination to caudal peduncle dorsal edge 13.1-14.2; dorsal-fin termination to caudal peduncle ventral edge 19.7-21.6; anal-fin termination to caudal peduncle dorsal edge 22.1-23.9; anal-fin termination to caudal peduncle ventral edge 16.1-17.8; first dorsal-fin spine 1.6-2.4; second dorsal-fin spine 4.1-5.9; third dorsal-fin spine 5.6-8.0; first segmented dorsal-fin ray 10.2-12.5; fourth last segmented dorsal-fin ray 13.6-17.3; first anal-fin spine 1.2-2.4; second anal-fin spine 2.9-5.1; third anal-fin spine 5.1-7.3; first segmented anal-fin ray 7.8-12.1; fourth last segmented anal-fin ray 13.1-16.9; third pectoral-fin ray 15.1-19.2; pelvic-fin spine 7.1-10.7; second segmented pelvic-fin ray 13.1-20.8; caudal-fin length 20.7-24.7.

Live coloration: Females: not known. Males (based on photograph of holotype when freshly dead; Plate 12H): head and body more-or-less uniformly bright yellowish olive; iris olive, becoming bright yellow centrally, with bright blue (dorsally and ventrally) to grey (anteriorly and posteriorly) suboval ring around pupil; dorsal and anal fins bright yellowish olive, darker basally; caudal fin olive basally, with remainder of fin bright greenish yellow, becoming greenish to olivish hyaline posteriorly; pectoral fins olivish hyaline, with distal margin brownish; pelvic fins bright yellow, olive distally.

Preserved coloration (males and females): head and body brown, paler ventrally; dorsal and anal fins pale brown to brown, sometimes darker basally; caudal fin pale brown, slightly darker basally; pectoral fins brownish hyaline; pelvic fins pale brown.

HABITAT AND DISTRIBUTION: Known only from the four type specimens, which were collected from reefs in 0.1 to 10 m at Christmas Id, Indian Ocean (Figure 55).

COMPARISONS: *Pseudochromis viridis* closely resembles *P. coccinicauda* (from the eastern and central Indian Ocean), *P. cyanotaenia* (from the eastern Indian Ocean and West Pacific, east to the Gilbert Ids), *P. melanurus* (from Fiji and Tonga) and *P. tapeinosoma* (from the eastern Indian Ocean and West Pacific, east to the Solomon Ids) in having relatively low segmented dorsal- and segmented anal-fin ray counts (modally 22 and 13, respectively), 16 circumpeduncular scales, and only two epurals. Characters distinguishing these species are discussed under *Comparisons* for *P. coccinicauda* (see also Gill & Allen, 1996: 36, tab. 1).

REMARKS: Gill & Allen (1996) provide a colour photograph of the freshly dead male holotype of the species. The female coloration is unknown, but is probably similar to other members of the *P. tapeinosoma* group (*P. coccinicauda, P. cyanotaenia, P. melanurus* and *P. tapeinosoma*; see Gill & Allen, 1996: 36).

ETYMOLOGY: The specific epithet is from the Latin meaning green, and alludes to the distinctive male coloration of the species.

MATERIAL EXAMINED: CHRISTMAS ID, INDIAN OCEAN: S of North East Point, WAM P.29331-013, 1(1), 41.1 mm SL (holotype); Flying Fish Cove, BMNH 1995.11.13.25, 25.5 mm SL (paratype), WAM P.26120-008, 42.8 mm SL (paratype), North West Point, WAM P.26122-004, 1(1), 28.9 mm SL (paratype).

Pseudochromis wilsoni (Whitley)

Yellowfin Dottyback

Figure 55; Plates 12I-J

Leptochromis tapeinosoma wilsoni Whitley, 1929: 113 (type locality: Port Darwin, Northern Territory, Australia); McCulloch, 1929: 158 (list); Whitley, 1947: 149 (Cape Leveque, Western Australia); Whitley, 1948: 18 (list); Scott, 1959: 74 (key).

Pseudochromis wilsoni; Taylor, 1964: 166 (East Point Reef and Yirrkalla, Northern Territory); Allen, 1985: 2508, figs 151-152 (list, Western Australia; colour figs); Burgess et al., 1988: pl. 151 (colour fig.); Allen & Swainston, 1988: 60, pl. 21, fig. 339 (sexual dimorphism); Larson, 1988: 161 (list; Darwin Harbour); Paxton et al., 1989: 521 (list; distribution); Gill, 1990b: 130 (description; distribution; sexual dimorphism; colour figs); Hutchins, 1990: 269 (list; Shark Bay, Western Australia); Burgess et al., 1991: 201 (colour fig.); Gill, 1993: 46 (sexual dimorphism; distribution); Lieske & Myers, 1994: pl. 31, fig. 14 (colour fig.; habitat and distribution); Gill, 1997: 130 (description; distribution; sexual dimorphism; colour figs); Allen, 1997: 94, pl. 28-16 (description; distribution; colour figs); Gill, 1999b: 2564 (key).

Pseudochromis xanthochir [*non* Bleeker, 1855a]; Burgess et al., 1988: pl. 151 (colour fig.).

Devisina wilsoni; Whitley, 1964a: 42 (list).

DIAGNOSIS: *Pseudochromis wilsoni* is distinguished from congeners in having the following combination of characters: segmented dorsal-fin rays 25-27, usually 26; segmented anal-fin rays usually 14, rarely 13 or 15; scales in lateral series 38-45, usually 39-43; circumpeduncular scales 19-23; circumorbital pores 22-49; and anal-fin spines weakly pungent to pungent, the second spine about as stout as the third.

DESCRIPTION (based on 63 specimens, 24.1-65.5 mm SL): dorsal-fin rays III,25-27, last 9-27 segmented rays branched (all or all but first 1-3 branched in specimens larger than about 50 mm SL); anal-fin rays III,13-15, all or all but first 1-2 segmented rays branched; pectoral-fin rays 15-19; upper procurrent caudal-fin rays 6-7; lower procurrent caudal-fin rays 6-7; total caudal-fin rays 29-31; scales in lateral series 38-45; anterior lateral-line scales 28-37; anterior lateral line terminating beneath segmented dorsal-fin ray 16-22; posterior lateral-line scales 6-14 + 0-2; scales between lateral lines 3-5; horizontal scale rows above anal-fin origin 13-17 + 1 + 2-4 = 17-21; circumpeduncular scales 19-23; predorsal scales 17-24; scales behind eye 2-4; scales to preopercular angle 4-6; gill rakers 3-7 + 11-14 = 14-20; pseudobranch filaments 7-11; circumorbital pores 22-49; preopercular pores 10-21; dentary pores 4-7; posterior interorbital pores 1-3.

Lower lip varying from incomplete with a weak to relatively

broad symphyseal interruption to complete; dorsal and anal fins without scale sheaths, although sometimes with intermittent scales overlapping fin bases; predorsal scales extending anteriorly to point ranging from vicinity of anterior AIO pores to posterior nostrils; opercle with 1-8 small, usually inconspicuous serrations; teeth of outer ceratobranchial-1 gill rakers either weakly developed or with well-developed teeth confined to raker tips, although sometimes with moderately developed teeth running most of length of rakers; anterior dorsal-fin pterygiophore formula S/S/S + 3/1 + 1/1 + 1*/1; dorsal-fin spines relatively slender, tips weakly pungent to pungent; anterior anal-fin pterygiophore formula 3/1 + 1*/1/1 + 1; anal-fin spines relatively slender and weakly pungent to pungent, second spine slightly stouter than third; pelvic-fin spine moderately slender, tip weakly pungent to pungent; second segmented pelvic-fin ray usually longest, although third sometimes subequal or slightly longer; caudal fin rounded, posterior margin often weakly rounded to truncate; vertebrae 10 + 16; epineurals 13; epurals 3.

Upper jaw with 2-5 pairs of curved, enlarged caniniform teeth anteriorly, and 4-6 (at symphysis) to 1-3 (on sides of jaw) inner rows of small conical teeth, outermost of rows of conical teeth much larger and more curved than inner rows; lower jaw with 2-4 pairs of curved, enlarged caniniform teeth anteriorly, and 3-5 (at symphysis) to 1 (on sides of jaw) inner rows of small conical teeth, teeth on middle of jaw larger and curved; vomer with 1-3 rows of small conical teeth, forming chevron; palatine with 1-4 rows of small conical teeth arranged in elongate, suboval patch, anterior part of tooth patch more-or-less contiguous with posterolateral arm of vomerine tooth patch; ectopterygoid edentate; tongue moderately pointed and edentate.

As percentage of SL (based on 28 specimens, 26.0-65.5 mm SL): head length 23.0-28.0; orbit diameter 7.5-11.5; snout length 4.8-6.0; fleshy interorbital width 4.0-5.5; bony interorbital width 2.4-3.4; body width 11.0-13.6; snout tip to posterior tip of retroarticular bone 12.5-15.1; predorsal length 30.2-36.4; prepelvic length 31.0-36.1; posterior tip of retroarticular bone to pelvic-fin origin 19.0-25.5; dorsal-fin origin to pelvic-fin origin 27.1-30.3; dorsal-fin origin to middle dorsal-fin ray 31.1-35.8; dorsal-fin origin to anal-fin origin 40.4-44.4; pelvic-fin origin to anal-fin origin 24.4-32.9; middle dorsal-fin ray to dorsal-fin termination 23.8-28.5; middle dorsal-fin ray to anal-fin origin 26.2-29.1; anal-fin origin to dorsal-fin termination 30.9-35.3; anal-fin base length 23.6-27.3; dorsal-fin termination to anal-fin termination 16.2-18.2; dorsal-fin termination to caudal peduncle dorsal edge 11.5-14.4; dorsal-fin termination to caudal peduncle ventral edge 20.0-22.4; anal-fin termination to caudal peduncle dorsal edge 21.5-24.3; anal-fin termination to caudal peduncle ventral edge 11.7-16.5; first dorsal-fin spine 1.5-2.6; second dorsal-fin spine 2.9-5.8; third dorsal-fin spine 6.4-9.8; first segmented dorsal-fin ray 12.1-15.0; fourth last segmented dorsal-fin ray 14.9-18.1; first anal-fin spine 1.2-3.0; second anal-fin spine 3.1-5.2; third anal-fin spine 6.2-8.8; first segmented anal-fin ray 10.3-13.5; fourth last segmented anal-fin ray 13.4-16.5; third pectoral-fin ray 14.6-17.2; pelvic-fin spine 7.7-12.3; second segmented pelvic-fin ray 19.6-25.9; caudal-fin length 22.2-26.4.

Live coloration: Juveniles and females (based on photographs of specimens from Western Australia, the Northern Territory and Queensland and captive specimens from the Keppel Ids, Queensland; Plate 12I): head and body greenish to bluish grey, becoming bright yellow on caudal peduncle in small juveniles; iris pale yellow to pale orange or grey with blue suboval ring around pupil; basal half to two-thirds of dorsal fin bright yellow, remainder of fin yellowish hyaline to hyaline with bluish grey distal margin; anal fin hyaline, sometimes with basal area bright yellow to grey; caudal fin bluish grey on basal portion and on middle rays, upper and lower borders of fin broadly bright yellow, becoming yellowish hyaline to hyaline posteriorly; caudal fin of small juveniles sometimes bright yellow, becoming yellowish hyaline to hyaline posteriorly; pectoral and pelvic fins greyish hyaline to hyaline. Males (based on photographs of specimens from Western Australia, the Northern Territory and Queensland; Plates 12J): head and body pale blue to dark greenish grey; iris bright orange to bright red with bright blue suboval ring around pupil; dorsal and anal fins pale blue to grey or greyish hyaline, usually dark bluish grey to dark grey on basal third of fin, sometimes with two to five pale orange to grey narrow stripes on distal part of fins; caudal fin greyish blue to dark grey, becoming greyish or bluish hyaline posteriorly, with upper and lower borders of fin abruptly pale grey to hyaline; pectoral and pelvic fins bluish to greyish hyaline.

Preserved coloration: Juveniles and females: pattern similar to live coloration, head and body becoming pale brown to grey-brown, darker dorsally; posttemporal pore patch not notably darker than adjacent head coloration; bright yellow and yellowish hyaline areas on dorsal and caudal fins becoming pale grey to white; anal fin hyaline to dusky hyaline; pectoral fins hyaline; pelvic fins hyaline to pale brown. Males: pattern similar to live coloration, head and body becoming pale brown to grey-brown, darker dorsally, usually with series of dark oblique bars posteriorly above anal fin; dorsal and anal fins brownish hyaline, paler basally; caudal fin brown, pale grey to hyaline on upper and lower margins; pectoral fins hyaline; pelvic fins pale brown.

HABITAT AND DISTRIBUTION: *Pseudochromis wilsoni* is known only from the coast and continental islands of northern Australia, from Port Denison, Western Australia to Bargara, Queensland (Figure 55). It has been collected from rock and coral reefs and tidal pools, often in relatively silty areas, at depths ranging to 32 m.

COMPARISONS: This species is distinct within the subfamily in having the following combination of characters: segmented dorsal-fin rays 25-27, usually 26; segmented anal-fin rays 13-15, rarely 13 or 15; scales in lateral series 38-45, usually 39-43; circumpeduncular scales 19-23; and anal-fin spines relatively slender and weakly pungent to pungent, with the second spine about as stout as the third. It is often confused in collections with *P. flammicauda*, which it closely resembles in general physiognomy. However, it differs from that species in having a higher modal number of segmented dorsal-fin rays (25-27, usually 26 versus 23-25, usually 24), smaller scales (scales in lateral series 38-45, usually 39-43 versus 36-40, usually 37-39), and more circumorbital pores (22-49 versus 14-20).

REMARKS: *Pseudochromis wilsoni* is a moderate-sized

species; the largest specimen examined measured 65.5 mm SL. The above-noted sexual dimorphism was determined from a superficial examination of gonads of museum specimens. Furthermore, this species appears to be a protogynous hermaphrodite: almost all small specimens examined were females, and the gonads of several male specimens contained ovarian tissue ventrally. In one specimen with male coloration, the right gonad appeared to be a testis and the left an ovary. Colour illustrations of females are provided in Allen (1985: fig. 152), Burgess et al. (1988: pl. 151 - misidentified as *P. xanthochir*; 1991) and Gill (1990b; 1997), and of males in Allen (1985: fig. 151), Burgess et al. (1988: pl. 151 - as *P. wilsoni*) and Gill (1990b, 1997).

ETYMOLOGY: The specific epithet is for Leonard Wilson, collector of the type specimens.

MATERIAL EXAMINED: WESTERN AUSTRALIA, AUSTRALIA: Port Denison, Whitetops Reef, WAM P.27957-016, 2(2), 60.8-65.5 mm SL, WAM P.27957-017, 3(0), 19.0-24.0 mm SL; Port Denison, W side of Irwin Reef, WAM P.27955-012, 1(1), 52.0 mm SL; Houtman Abrolhos, N end of Dick's Id, WAM P.27590-004, 11(11), 33.9-49.4 mm SL; Houtman Abrolhos, Long Id, WAM P.27596-003, 2(0), 48.5-53.3; Houtman Abrolhos, Beacon Id, WAM P.26069-007, 1(0), 48.0 mm SL; Kalbarri, off Murchison River, WAM P.27959-009, 3(0), 53.0-62.9 mm SL, WAM P.27960-010, 4(0), 17.0-57.0 mm SL; Point Quobba, WAM P.27970-009, 3(3), 45.2-52.1 mm SL; Point Quobba, Fitzroy Reefs, WAM P.27967-012, 1(0), 51.8 mm SL; NW side of Serrurier Id, MPM 32612, 3(0), 40.4-41.0 mm SL; Monte Bello Ids, Daisey Id, WAM P.27978-001, 4(4), 37.6-44.3 mm SL. NORTHERN TERRITORY, AUSTRALIA: Darwin (Port Darwin), AMS IA.3873, 1(1), 49.2 mm SL (holotype); Darwin, East Point Reef, NTM S.10417-021, 5(5), 28.6-35.2 mm SL, NTM S.10696-018, 16(4, 33.8-48.6 mm SL, cleared and stained), 20.0-48.6 mm SL; Coburg Peninsula, Trepang Bay, NTM S.10011-003, 13(12, 24.1-47.8 mm SL), 11.0-47.8 mm SL. QUEENSLAND, AUSTRALIA: Gulf of Carpentaria, Pisonia Ids, AMS IB.8351, 1(1), 49.3 mm SL; Torres Straits, 9°40'S 142°33'E, QM I.17519, 1(1), 47.3 mm SL; Torres Straits, 9°57'S 141°39'E, QM I.17518, 1(1),34.0 mm SL; Torres Strait Ids, Yorke Id, QM I.6392, 1(1), 38.1 mm SL; Torres Strait Ids, Prince of Wales Id, QM I.6526, 1(1), 49.5 mm SL; Cape York, False Orford Ness, AMS I.20776-025, 5(5), 32.1-49.0 mm SL; Cape York, Haggerstone Id, AMS I.20937-019, 2(2), 36.8-37.8 mm SL; S side of Decapolis Reef, AMS I.19460-042, 1(1), 34.2 mm SL; Little Hope Id, ANSP 121893, 1(1), 31.5 mm SL; Frankland Ids, QM I.21123, 2(2),36.0-36.5 mm SL; North Barnard Id, AMS IA.2356, 1(1), 37.9 mm SL; Whitsunday Passage, AMS IA.918, 1(1), 40.5 mm SL; Whitsunday Ids, Hayman Id, AMS IA.1988, 2(1, 45.6 mm SL), 25.6-45.6 mm SL; Shoalwater Bay, Cannibal Group, off S side of Collins Id, AMS I.34311-045, 28(0), 18.0-47.0 mm SL; Cumberland Id, AMS IA.2357, 1(1), 42.7 mm SL; Keppel Ids, AMS I.32004-001, 1(1), 47.7 mm SL; Bargara, Kelly's Beach, WAM P.27064-004, 2(2), 45.2-46.7 mm SL, WAM P.27065-002, 1(1), 27.3 mm SL.

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Appendix 1. Frequency distribution of selected meristic characters of pseudochromine species.
Appendix Table 1a. Dorsal-fin rays.

	Spines			Segmented rays																		
	II	III	IV	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Ad. desmonotus	-	61	-	-	-	-	-	-	2	53	6	-	-	-	-	-	-	-	-	-	-	-
As. punctatus	-	63	-	-	-	3	57	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. purpurascens	-	70	-	-	-	2	66	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. zaps	-	46	-	-	-	2	44	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. atrofasciatus	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
L. cyclophthalmus	97	-	-	-	-	-	-	1	93	3	-	-	-	-	-	-	-	-	-	-	-	-
L. lineatus	43	-	-	-	-	-	-	1	41	-	-	-	-	-	-	-	-	-	-	-	-	-
M. alleni	-	5	-	-	-	-	-	-	-	-	-	4	1	-	-	-	-	-	-	-	-	-
M. paranox	-	23	-	-	-	-	-	-	-	-	-	2	9	10	2	-	-	-	-	-	-	-
M. polynemus	-	7	-	-	-	-	-	-	-	-	1	3	3	-	-	-	-	-	-	-	-	-
M. splendens	-	24	-	-	-	-	-	-	-	-	2	12	10	-	-	-	-	-	-	-	-	-
M. winterbottomi	-	5	-	-	-	-	-	-	-	-	2	2	1	-	-	-	-	-	-	-	-	-
Og. novaehollandiae	-	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	5	9	3	1
Og. queenslandiae	-	36	1	-	-	-	-	-	-	-	-	-	-	-	-	1	1	13	14	6	2	-
Og. salvati	-	23	-	-	-	-	-	-	-	-	-	-	-	-	2	6	13	2	-	-	-	-
Ox. veliferus	18	-	-	-	-	-	-	-	16	1	-	-	-	-	-	-	-	-	-	-	-	-
Ph. marginata	-	17	-	-	-	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. aurifrons	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. coralensis	-	54	-	-	3	51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. diadema	-	18	-	-	2	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. ephippiata	-	2	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. paccagnellae	-	71	-	-	3	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. porphyrea	-	44	-	-	2	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aldabraensis	-	88	1	-	-	-	-	-	-	-	1	12	51	21	4	-	-	-	-	-	-	-
Ps. alticaudex	-	39	-	-	-	-	-	38	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. andamanensis	-	41	-	-	-	1	1	34	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aureolineatus	-	3	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-
Ps. aurulentus	-	3	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-
Ps. bitaeniatus	-	39	-	-	-	-	-	-	4	30	5	-	-	-	-	-	-	-	-	-	-	-
Ps. caudalis	-	26	-	-	-	-	-	-	-	-	-	14	12	-	-	-	-	-	-	-	-	-
Ps. coccinicauda	-	30	-	-	-	29	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. colei	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cometes	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Ps. cyanotaenia	-	125	-	-	2	120	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dilectus	-	18	-	-	-	-	-	-	-	-	-	-	11	6	1	-	-	-	-	-	-	-
Ps. dixurus	-	14	-	-	-	-	-	-	1	4	7	2	-	-	-	-	-	-	-	-	-	-
Ps. dutoiti	-	27	-	-	-	-	-	-	-	-	-	-	1	9	14	3	-	-	-	-	-	-
Ps. elongatus	-	23	-	-	-	-	-	-	1	21	1	-	-	-	-	-	-	-	-	-	-	-
Ps. flammicauda	-	33	-	-	-	-	2	29	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavivertex	-	34	-	-	-	-	-	-	2	11	19	2	-	-	-	-	-	-	-	-	-	-
Ps. flavopunctatus	-	8	-	-	-	-	-	-	2	5	1	-	-	-	-	-	-	-	-	-	-	-
Ps. fowleri	-	27	-	-	-	-	5	20	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fridmani	-	24	-	-	-	-	-	-	4	20	1	-	-	-	-	-	-	-	-	-	-	-
Ps. fuscus	-	198	1	-	-	-	-	-	16	121	45	13	4	-	-	-	-	-	-	-	-	-
Ps. howsoni	-	30	-	-	-	-	-	-	3	24	3	-	-	-	-	-	-	-	-	-	-	-
Ps. jamesi	-	34	-	-	-	-	-	1	29	4	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kolythrus	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kristinae	-	37	-	-	-	-	-	-	5	30	1	-	-	-	-	-	-	-	-	-	-	-
Ps. leucorhynchus	-	19	-	-	-	-	-	-	-	-	-	1	1	4	12	1	-	-	-	-	-	-
Ps. linda	-	44	-	-	-	-	-	-	-	3	24	15	2	-	-	-	-	-	-	-	-	-
Ps. litus	-	6	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. luteus	-	26	-	-	-	-	-	3	17	6	-	-	-	-	-	-	-	-	-	-	-	-
Ps. madagascariensis	-	5	-	-	-	-	-	-	-	3	2	-	-	-	-	-	-	-	-	-	-	-
Ps. magnificus	-	26	-	-	-	-	1	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. marshallensis	-	129	-	-	-	-	-	11	104	13	1	-	-	-	-	-	-	-	-	-	-	-
Ps. melanurus	-	42	-	-	1	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melas	-	33	-	-	-	-	-	-	4	27	2	-	-	-	-	-	-	-	-	-	-	-
Ps. mooii	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Ps. moorei	-	6	-	-	-	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-
Ps. natalensis	-	44	-	-	-	-	-	-	-	7	32	5	-	-	-	-	-	-	-	-	-	-
Ps. nigrovittatus	-	28	-	-	-	-	-	-	-	2	21	5	-	-	-	-	-	-	-	-	-	-
Ps. olivaceus	-	55	-	-	-	-	-	-	-	4	32	19	-	-	-	-	-	-	-	-	-	-
Ps. omanensis	-	14	-	-	-	-	-	-	-	-	-	-	2	10	2	-	-	-	-	-	-	-
Ps. persicus	-	32	-	-	-	-	-	-	-	-	-	-	8	21	3	-	-	-	-	-	-	-
Ps. perspicillatus	-	24	-	-	-	-	-	6	17	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pesi	-	18	-	-	-	-	-	-	-	15	3	-	-	-	-	-	-	-	-	-	-	-
Ps. pictus	-	2	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Ps. punctatus	-	5	-	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pylei	-	7	-	-	-	-	-	-	1	4	2	-	-	-	-	-	-	-	-	-	-	-
Ps. quinquedentatus	-	48	-	-	-	-	-	-	14	32	2	-	-	-	-	-	-	-	-	-	-	-
Ps. ransonneti	-	24	-	-	-	-	1	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. reticulatus	-	12	-	-	-	-	-	-	-	11	1	-	-	-	-	-	-	-	-	-	-	-
Ps. sankeyi	-	21	-	-	-	-	-	-	-	7	13	1	-	-	-	-	-	-	-	-	-	-
Ps. springeri	-	21	-	-	-	-	-	-	-	-	-	1	10	7	3	-	-	-	-	-	-	-
Ps. steenei	-	6	-	-	-	-	-	-	1	5	-	-	-	-	-	-	-	-	-	-	-	-
Ps. striatus	-	4	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tapeinosoma	-	88	-	-	2	82	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tauberae	-	33	-	-	-	-	-	-	-	-	-	9	20	4	-	-	-	-	-	-	-	-
Ps. viridis	-	4	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. wilsoni	-	63	-	-	-	-	-	-	8	50	5	-	-	-	-	-	-	-	-	-	-	-

Appendix Table 1b. Segmented anal- and pectoral-fin rays (the latter including bilateral counts).

	Segmented anal-fin rays												Pectoral-fin rays						
	10	11	12	13	14	15	16	17	18	19	20	21	14	15	16	17	18	19	20
Ad. desmonotus	-	-	-	-	14	37	10	-	-	-	-	-	1	-	17	89	9	-	-
As. punctatus	-	-	1	58	3	-	-	-	-	-	-	-	-	1	2	45	78	-	-
C. purpurascens	-	-	-	1	66	2	-	-	-	-	-	-	-	-	-	23	103	13	-
C. zaps	-	-	-	-	45	-	-	-	-	-	-	-	-	-	2	69	20	1	-
L. atrofasciatus	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2
L. cyclophthalmus	-	-	-	-	92	5	-	-	-	-	-	-	-	-	-	1	36	149	3
L. lineatus	-	-	-	2	38	2	-	-	-	-	-	-	-	-	-	1	15	64	3
M. alleni	-	-	-	-	1	4	-	-	-	-	-	-	-	-	-	10	-	-	-
M. paranox	-	-	-	-	-	-	5	16	2	-	-	-	-	-	-	1	28	9	-
M. polynemus	-	-	-	-	4	3	-	-	-	-	-	-	-	-	1	9	4	-	-
M. splendens	-	-	-	-	-	21	3	-	-	-	-	-	-	-	7	36	5	-	-
M. winterbottomi	-	-	-	-	-	3	2	-	-	-	-	-	-	-	1	9	-	-	-
Og. novaehollandiae	-	-	-	-	-	-	-	-	-	4	16	-	-	-	-	2	16	16	-
Og. queenslandiae	-	-	-	-	-	-	-	-	1	12	20	4	-	-	-	-	9	55	2
Og. salvati	-	-	-	-	-	-	-	-	-	4	16	3	-	-	-	-	20	26	-
Ox. veliferus	-	-	-	-	-	-	18	-	-	-	-	-	-	-	-	14	22	-	-
Ph. marginata	-	-	-	17	-	-	-	-	-	-	-	-	-	-	-	-	5	28	1
Pi. aurifrons	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-
Pi. coralensis	-	1	53	-	-	-	-	-	-	-	-	-	-	-	9	82	14	-	-
Pi. diadema	-	2	16	-	-	-	-	-	-	-	-	-	-	-	6	30	-	-	-
Pi. ephippiata	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-
Pi. paccagnellae	-	3	66	1	-	-	-	-	-	-	-	-	-	2	15	119	6	-	-
Pi. porphyrea	1	6	37	-	-	-	-	-	-	-	-	-	-	-	11	68	7	2	-
Ps. aldabraensis	-	-	-	-	-	-	1	6	58	24	-	-	-	-	3	91	81	8	-
Ps. alticaudex	-	-	5	34	-	-	-	-	-	-	-	-	-	-	1	56	19	2	-
Ps. andamanensis	-	-	-	7	33	1	-	-	-	-	-	-	-	-	-	17	62	2	-
Ps. aureolineatus	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	6	-
Ps. aurulentus	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	2	4	-
Ps. bitaeniatus	-	-	-	-	39	-	-	-	-	-	-	-	-	-	7	69	1	-	-
Ps. caudalis	-	-	-	-	-	-	-	15	10	1	-	-	-	-	-	-	16	35	1
Ps. coccinicauda	-	-	2	28	-	-	-	-	-	-	-	-	-	-	-	1	46	13	-
Ps. colei	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	2	-	-
Ps. cometes	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
Ps. cyanotaenia	-	-	4	120	1	-	-	-	-	-	-	-	-	-	2	25	168	60	1
Ps. dilectus	-	-	-	-	-	4	14	-	-	-	-	-	-	-	-	1	31	4	-
Ps. dixurus	-	-	-	1	11	1	-	-	-	-	-	-	-	-	2	24	2	-	-
Ps. dutoiti	-	-	-	-	-	-	-	-	13	11	1	-	-	1	-	1	50	2	-
Ps. elongatus	-	-	-	-	1	22	-	-	-	-	-	-	-	-	9	35	2	-	-
Ps. flammicauda	-	-	-	1	32	-	-	-	-	-	-	-	-	-	-	12	50	4	-
Ps. flavivertex	-	-	-	-	14	19	1	-	-	-	-	-	-	-	23	41	4	-	-
Ps. flavopunctatus	-	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	2	12	2
Ps. fowleri	-	-	-	1	26	-	-	-	-	-	-	-	-	-	-	9	41	2	-
Ps. fridmani	-	-	-	-	2	13	-	-	-	-	-	-	-	5	35	10	-	-	-
Ps. fuscus	-	-	-	12	182	2	-	-	-	-	-	-	-	-	1	13	256	121	3
Ps. howsoni	-	-	-	1	28	-	-	-	-	-	-	-	-	-	-	2	36	21	1
Ps. jamesi	-	-	-	2	32	-	-	-	-	-	-	-	-	-	-	-	52	15	1
Ps. kolythrus	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	2	-	-
Ps. kristinae	-	-	-	-	4	27	6	-	-	-	-	-	-	-	2	2	53	16	-
Ps. leucorhynchus	-	-	-	-	-	-	-	5	10	3	1	-	-	-	-	3	32	3	-
Ps. linda	-	-	-	-	1	17	26	-	-	-	-	-	-	-	-	6	65	13	-
Ps. litus	-	-	-	-	3	3	-	-	-	-	-	-	-	-	-	6	6	-	-
Ps. luteus	-	-	-	3	23	-	-	-	-	-	-	-	-	-	1	27	22	2	-
Ps. madagascariensis	-	-	-	-	-	-	3	2	-	-	-	-	-	-	-	-	10	-	-
Ps. magnificus	-	-	-	1	23	2	-	-	-	-	-	-	-	-	1	-	15	35	1
Ps. marshallensis	-	1	7	113	8	-	-	-	-	-	-	-	-	-	1	55	188	13	-
Ps. melanurus	-	-	2	39	1	-	-	-	-	-	-	-	-	1	-	2	69	11	-
Ps. melas	-	-	-	-	1	31	1	-	-	-	-	-	-	-	-	-	8	57	1
Ps. mooii	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2	-	-
Ps. moorei	-	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	12	-	-
Ps. natalensis	-	-	-	-	-	-	1	38	4	-	-	-	-	-	-	2	62	26	-
Ps. nigrovittatus	-	-	-	-	-	1	15	12	-	-	-	-	-	-	1	8	46	1	-
Ps. olivaceus	-	-	-	-	1	47	7	-	-	-	-	-	-	-	-	9	85	16	-
Ps. omanensis	-	-	-	-	-	-	-	-	-	4	8	-	-	-	-	-	1	22	3
Ps. persicus	-	-	-	-	-	-	-	-	-	14	17	2	-	-	-	-	12	44	10
Ps. perspicillatus	-	-	-	3	21	-	-	-	-	-	-	-	-	-	-	1	30	11	1
Ps. pesi	-	-	-	-	2	16	-	-	-	-	-	-	-	-	-	5	31	-	-
Ps. pictus	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	3	1	-
Ps. punctatus	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	2	5	2	-
Ps. pylei	-	-	-	-	2	5	-	-	-	-	-	-	-	-	-	-	14	-	-
Ps. quinquedentatus	-	-	-	8	40	-	-	-	-	-	-	-	-	-	-	2	21	68	5
Ps. ransonneti	-	-	-	2	22	-	-	-	-	-	-	-	-	-	-	2	43	2	-
Ps. reticulatus	-	-	-	-	1	11	-	-	-	-	-	-	-	-	-	2	21	1	-
Ps. sankeyi	-	-	-	-	1	9	11	-	-	-	-	-	-	-	20	22	-	-	-
Ps. springeri	-	-	-	-	-	-	-	2	12	7	-	-	-	-	7	27	6	-	-
Ps. steenei	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	11	1	-
Ps. striatus	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	7	1	-	-
Ps. tapeinosoma	-	-	2	84	2	-	-	-	-	-	-	-	-	-	2	45	124	6	-
Ps. tauberae	-	-	-	-	-	4	26	2	-	-	-	-	-	-	-	-	21	44	-
Ps. viridis	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	1	6	1	-
Ps. wilsoni	-	-	-	3	56	3	-	-	-	-	-	-	-	1	-	23	99	2	-

Appendix Table 1c. Upper procurrent, lower procurrent and total caudal-fin rays.

	Upper procurrent							Lower procurrent						Total rays									
	3	4	5	6	7	8	9	3	4	5	6	7	8	23	24	25	26	27	28	29	30	31	32	33	34
Ad. desmonotus	30	29	-	-	-	-	-	58	4	-	-	-	-	29	28	1	-	-	-	-	-	-	-	-	-
As. punctatus	-	2	60	-	-	-	-	-	55	6	-	-	-	-	-	2	53	6	-	-	-	-	-	-	-
C. purpurascens	-	-	4	64	1	-	-	-	2	57	8	-	-	-	-	-	1	3	50	10	-	1	-	-	-
C. zaps	-	-	-	45	1	-	-	-	-	39	7	-	-	-	-	-	-	-	38	7	1	-	-	-	-
L. atrofasciatus	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
L. cyclophthalmus	-	-	11	68	-	-	-	-	2	73	4	-	-	-	-	-	1	10	69	4	-	-	-	-	-
L. lineatus	-	-	11	30	-	-	-	-	-	29	1	-	-	-	-	-	-	1	28	1	-	-	-	-	-
M. alleni	-	-	-	5	-	-	-	-	-	3	2	-	-	-	-	-	-	-	3	2	-	-	-	-	-
M. paranox	-	-	-	17	4	-	-	-	-	-	19	2	-	-	-	-	-	-	-	16	4	1	-	-	-
M. polynemus	-	-	-	7	-	-	-	-	-	-	7	-	-	-	-	-	-	-	-	7	-	-	-	-	-
M. splendens	-	-	-	22	-	-	-	-	-	1	21	-	-	-	-	-	-	-	1	21	-	-	-	-	-
M. winterbottomi	-	-	1	4	-	-	-	-	-	-	5	-	-	-	-	-	-	-	1	4	-	-	-	-	-
Og. novaehollandiae	-	-	-	17	3	-	-	-	-	16	4	-	-	-	-	-	-	-	12	1	2	-	-	-	-
Og. queenslandiae	-	-	-	33	3	-	-	-	-	33	3	-	-	-	-	-	-	-	28	1	2	-	-	-	-
Og. salvati	-	-	-	21	-	-	-	-	-	21	1	-	-	-	-	-	-	-	21	1	-	-	-	-	-
Ox. veliferus	-	-	-	17	-	-	-	-	-	15	1	-	-	-	-	-	-	-	14	1	-	-	-	-	-
Ph. marginata	-	-	2	15	-	-	-	-	-	16	1	-	-	-	-	-	-	2	14	1	-	-	-	-	-
Pi. aurifrons	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-
Pi. coralensis	-	-	-	8	45	1	-	-	-	-	29	25	-	-	-	-	-	-	-	7	23	23	1	-	-
Pi. diadema	-	-	1	16	1	-	-	-	-	4	14	-	-	-	-	-	-	1	3	13	1	-	-	-	-
Pi. ephippiata	-	-	-	-	2	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	1	1	-	-	-
Pi. paccagnellae	-	-	-	46	25	-	-	-	-	-	61	8	1	-	-	-	-	-	-	45	17	9	-	-	-
Pi. porphyrea	-	-	-	35	9	-	-	-	-	2	39	3	-	-	-	-	-	-	2	33	6	3	-	-	-
Ps. aldabraensis	-	-	-	5	73	11	-	-	-	-	33	54	2	-	-	-	-	-	-	4	26	51	7	1	-
Ps. alticaudex	-	-	-	9	29	1	-	-	-	-	19	20	-	-	-	-	-	-	-	7	12	7	6	-	-
Ps. andamanensis	-	-	-	8	30	-	-	-	-	-	21	19	-	-	-	-	-	-	-	7	15	18	-	-	-
Ps. aureolineatus	-	-	-	-	1	2	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	1	2	-	-
Ps. aurulentus	-	-	-	-	2	1	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	2	-	1	-
Ps. bitaeniatus	-	-	-	4	27	3	-	-	-	-	11	21	1	-	-	-	-	-	-	4	6	20	2	1	-
Ps. caudalis	-	-	-	-	1	24	-	-	-	-	-	17	8	-	-	-	-	-	-	-	-	1	14	8	-
Ps. coccinicauda	-	-	-	1	19	3	-	-	-	-	11	16	1	-	-	-	-	-	-	-	12	13	2	1	-
Ps. colei	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Ps. cometes	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Ps. cyanotaenia	-	-	-	3	93	19	-	-	-	-	38	77	2	-	-	-	-	-	-	2	36	57	20	-	-
Ps. dilectus	-	-	-	6	11	1	-	-	-	-	18	-	-	-	-	-	-	-	-	6	11	1	-	-	-
Ps. dixurus	-	-	-	-	11	3	-	-	-	-	-	12	2	-	-	-	-	-	-	-	-	10	3	1	-
Ps. dutoiti	-	-	-	1	22	3	1	-	-	-	6	20	-	-	-	-	-	-	-	1	4	18	2	1	-
Ps. elongatus	-	-	-	2	18	1	-	-	-	1	4	16	-	-	-	-	-	-	1	-	5	14	1	-	-
Ps. flammicauda	-	-	-	29	4	-	-	-	-	2	29	2	-	-	-	-	-	-	2	24	5	1	-	-	-
Ps. flavivertex	-	-	1	1	25	7	-	-	-	-	7	26	1	-	-	-	-	-	-	2	6	19	6	1	-
Ps. flavopunctatus	-	-	-	-	6	2	-	-	-	-	-	6	2	-	-	-	-	-	-	-	-	6	1	1	-
Ps. fowleri	-	-	-	14	12	-	-	-	-	-	22	4	-	-	-	-	-	-	-	14	8	4	-	-	-
Ps. fridmani	-	-	-	-	17	7	-	-	-	-	2	19	3	-	-	-	-	-	-	-	2	16	4	3	-
Ps. fuscus	-	-	2	146	43	-	-	-	1	16	163	9	-	-	-	-	-	3	15	128	35	7	-	-	-
Ps. howsoni	-	-	-	29	1	-	-	-	-	24	6	-	-	-	-	-	-	-	24	5	1	-	-	-	-
Ps. jamesi	-	-	-	3	25	5	-	-	-	-	14	19	-	-	-	-	-	-	-	3	11	14	5	-	-
Ps. kolythrus	-	-	-	1	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-
Ps. kristinae	-	-	-	-	27	10	-	-	-	-	4	32	1	-	-	-	-	-	-	-	4	24	8	1	-
Ps. leucorhynchus	-	-	-	-	8	11	-	-	-	-	1	16	2	-	-	-	-	-	-	-	1	5	6	1	-
Ps. linda	-	-	2	6	35	1	-	-	-	-	26	16	-	-	-	-	-	-	2	6	18	15	1	-	-
Ps. litus	-	-	-	2	4	-	-	-	-	-	4	2	-	-	-	-	-	-	-	2	2	2	-	-	-
Ps. luteus	-	-	-	11	15	-	-	-	-	2	21	2	-	-	-	-	-	-	1	10	13	1	-	-	-
Ps. madagascariensis	-	-	-	-	-	4	1	-	-	-	-	3	2	-	-	-	-	-	-	-	-	-	3	1	1
Ps. magnificus	-	-	-	24	2	-	-	-	-	-	20	6	-	-	-	-	-	-	-	20	4	2	-	-	-
Ps. marshallensis	-	-	1	28	95	2	-	-	-	1	52	73	-	-	-	-	-	1	-	21	38	64	2	-	-
Ps. melanurus	-	-	-	5	25	4	-	-	-	-	22	11	-	-	-	-	-	-	-	5	17	6	5	-	-
Ps. melas	-	-	-	12	20	1	-	-	-	1	22	9	1	-	-	-	-	-	-	12	12	8	-	1	-
Ps. mooii	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-
Ps. moorei	-	-	-	6	-	-	-	-	-	2	4	-	-	-	-	-	-	-	2	4	-	-	-	-	-
Ps. natalensis	-	-	-	1	34	9	-	-	-	1	33	10	-	-	-	-	-	-	-	2	28	8	6	-	-
Ps. nigrovittatus	-	-	-	2	21	5	-	-	-	-	10	18	-	-	-	-	-	-	-	-	10	15	3	-	-
Ps. olivaceus	-	-	-	17	37	1	-	-	-	-	43	11	1	-	-	-	-	-	-	18	26	9	2	-	-
Ps. omanensis	-	-	-	-	-	13	1	-	-	-	1	12	1	-	-	-	-	-	-	-	-	1	12	-	1
Ps. persicus	-	-	-	-	3	29	-	-	-	-	1	22	9	-	-	-	-	-	-	-	-	4	21	7	-
Ps. perspicillatus	-	-	-	5	18	1	-	-	-	-	19	5	-	-	-	-	-	-	-	4	9	6	-	-	-
Ps. pesi	-	-	-	-	16	2	-	-	-	-	8	10	-	-	-	-	-	-	-	-	8	8	3	-	-
Ps. pictus	-	-	-	1	1	-	-	-	-	1	1	-	-	-	-	-	-	-	1	-	1	-	-	-	-
Ps. punctatus	-	-	-	1	3	1	-	-	-	-	1	4	-	-	-	-	-	-	-	1	-	2	2	-	-
Ps. pylei	-	-	-	1	5	1	-	-	-	-	-	7	-	-	-	-	-	-	-	-	1	5	1	-	-
Ps. quinquedentatus	-	-	6	41	1	-	-	-	2	45	1	-	-	-	-	-	2	5	39	2	-	-	-	-	-
Ps. ransonneti	-	-	-	3	21	-	-	-	-	-	11	13	-	-	-	-	-	-	-	3	8	13	-	-	-
Ps. reticulatus	-	-	1	10	1	-	-	-	-	3	9	-	-	-	-	-	-	1	2	8	1	-	-	-	-
Ps. sankeyi	-	-	-	-	18	3	-	-	-	-	-	20	1	-	-	-	-	-	-	-	-	18	2	1	-
Ps. springeri	-	-	-	-	8	12	-	-	-	-	-	14	6	-	-	-	-	-	-	-	-	7	8	5	-
Ps. steenei	-	-	1	5	-	-	-	-	-	4	2	-	-	-	-	-	-	1	3	2	-	-	-	-	-
Ps. striatus	-	-	-	4	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	4	-	-	-	-	-
Ps. tapeinosoma	-	-	-	15	60	3	1	-	-	-	55	26	-	-	-	-	-	-	-	15	38	23	3	-	-
Ps. tauberae	-	-	-	-	20	6	-	-	-	-	4	22	1	-	-	-	-	-	-	-	4	16	5	1	-
Ps. viridis	-	-	-	2	2	-	-	-	-	-	3	1	-	-	-	-	-	-	-	2	1	1	-	-	-
Ps. wilsoni	-	-	-	48	15	-	-	-	-	-	55	7	-	-	-	-	-	-	-	45	9	7	-	-	-

Appendix Table 1d. Scales in lateral series (including bilateral counts).

	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
Ad. desmonotus	-	-	-	-	-	-	-	-	2	8	14	23	38	20	11	2	-	-	-	-	-	-	-	-	-	-	-	-
As. punctatus	-	-	-	-	-	-	-	-	-	-	-	3	4	8	14	23	30	18	19	5	1	1	-	-	-	-	-	-
C. purpurascens	-	-	-	5	12	29	29	29	27	6	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. zaps	-	-	1	2	2	16	25	27	14	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. atrofasciatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. cyclophthalmus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	5
L. lineatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. alleni	-	-	-	-	-	-	-	-	3	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. paranox	-	-	-	-	-	-	-	-	-	1	2	6	15	7	8	4	-	-	-	-	-	-	-	-	-	-	-	-
M. polynemus	-	-	-	-	-	-	-	-	-	2	3	5	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
M. splendens	-	-	-	-	-	-	-	-	-	3	2	21	16	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. winterbottomi	-	-	-	-	-	-	-	-	-	4	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Og. novaehollandiae	-	-	-	-	-	-	-	-	-	1	2	6	15	7	8	4	-	-	-	1	2	3	8	7	9	1	-	1
Og. queenslandiae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	8	21	17	8	6	2	-
Og. salvati	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	5	15	18	4	1	-	-	-	-	-	-
Ox. veliferus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	13	9	2	1	-	-	-	-
Ph. marginata	-	3	14	14	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. aurifrons	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. coralensis	-	-	-	-	-	-	-	-	-	1	4	13	33	30	15	11	1	-	-	-	-	-	-	-	-	-	-	-
Pi. diadema	-	-	-	-	1	2	2	8	9	9	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. ephippiata	-	-	-	-	-	-	-	-	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. paccagnellae	-	-	-	-	-	-	6	11	29	47	27	14	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. porphyrea	-	-	-	-	-	-	1	8	14	23	25	11	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aldabraensis	-	-	-	-	-	-	-	-	-	1	5	3	20	32	42	46	22	6	1	-	-	-	-	-	-	-	-	-
Ps. alticaudex	-	-	-	-	3	11	23	28	8	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. andamanensis	-	-	-	-	-	-	2	5	11	21	25	14	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aureolineatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3	-	-	-	-	-	-	-	-	-	-	-
Ps. aurulentus	-	-	-	-	-	-	-	-	-	-	-	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. bitaeniatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	15	20	21	10	4	-	-	-	-	-	-	-
Ps. caudalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	5	17	13	9	2	1	-	-
Ps. coccinicauda	-	-	-	-	-	-	1	4	7	17	16	12	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. colei	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cometes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-
Ps. cyanotaenia	-	-	-	3	18	57	70	57	31	9	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dilectus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	11	11	8	2	1	-	-	-	-	-	-	-
Ps. dixurus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6	7	8	2	2	-	-	-	-	-	-	-
Ps. dutoiti	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	7	11	17	15	2	-	-	-	-	-	-	-
Ps. elongatus	-	-	-	-	-	-	-	-	2	7	14	16	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flammicauda	-	-	-	-	-	-	-	-	-	5	9	21	26	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavivertex	-	-	-	-	-	-	-	-	-	-	-	-	1	1	8	13	21	15	5	2	-	-	-	-	-	-	-	-
Ps. flavopunctatus	-	-	-	-	-	-	-	-	1	6	4	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fowleri	-	-	-	4	8	20	18	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fridmani	-	-	-	-	-	-	-	-	-	-	-	5	10	9	12	5	5	1	3	-	-	-	-	-	-	-	-	-
Ps. fuscus	-	-	-	-	-	-	1	9	14	54	67	89	74	57	11	5	3	-	-	-	-	-	-	-	-	-	-	-
Ps. howsoni	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	14	17	15	4	1	1	-	-	-	-	-	-	-
Ps. jamesi	-	-	-	-	-	-	-	3	3	14	25	16	2	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kolythrus	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kristinae	-	-	-	-	-	-	-	-	-	-	-	-	6	17	26	14	8	3	-	-	-	-	-	-	-	-	-	-
Ps. leucorhynchus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	12	5	8	5	2	-	-	-	-	-	-	-
Ps. linda	-	-	-	-	-	-	-	-	-	-	-	1	-	8	20	28	13	10	7	1	-	-	-	-	-	-	-	-
Ps. litus	-	-	-	-	-	-	-	1	-	3	3	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. luteus	-	-	-	-	-	-	5	6	13	14	10	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. madagascariensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	3	5	1	-	-	-	-	-	-	-	-	-
Ps. magnificus	-	-	-	-	-	-	-	-	-	-	-	-	-	6	17	18	10	1	-	-	-	-	-	-	-	-	-	-
Ps. marshallensis	-	-	-	-	-	1	2	2	27	75	73	50	23	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melanurus	-	-	5	25	23	14	10	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melas	-	-	-	-	-	-	-	-	-	-	-	-	2	8	22	17	13	2	1	-	-	-	-	-	-	-	-	-
Ps. mooii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Ps. moorei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	6	1	1	1	1	-	-	-	-	-	-	-
Ps. natalensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	6	15	24	27	9	5	1	1	-	-	-	-
Ps. nigrovittatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	3	6	11	21	10	1	1	-	-	-	-	-
Ps. olivaceus	-	-	-	-	-	-	-	-	-	-	-	-	3	21	23	26	29	5	2	-	1	-	-	-	-	-	-	-
Ps. omanensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Ps. persicus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	5	5
Ps. perspicillatus	-	-	-	-	-	-	-	-	-	-	-	4	9	14	16	5	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pesi	-	-	-	-	-	-	-	-	-	-	-	-	1	10	10	9	2	3	-	-	-	-	-	-	-	-	-	-
Ps. pictus	-	-	-	-	-	-	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. punctatus	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	4	-	-	-	-	-	-	-	-	-	-	-
Ps. pylei	-	-	-	-	-	-	-	-	-	4	7	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. quinquedentatus	-	-	-	-	-	-	-	-	-	-	-	-	2	6	16	25	23	9	10	4	1	-	-	-	-	-	-	-
Ps. ransonneti	-	-	-	-	-	-	-	-	-	11	13	16	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. reticulatus	-	-	-	-	-	-	1	9	4	7	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. sankeyi	-	-	-	-	-	-	-	-	-	-	-	1	1	4	3	7	11	9	5	1	-	-	-	-	-	-	-	-
Ps. springeri	-	-	-	-	-	-	-	-	5	4	7	2	12	5	5	2	-	-	-	-	-	-	-	-	-	-	-	-
Ps. steenei	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	5	3	1	-	-	-	-	-	-	-	-	-
Ps. striatus	-	-	-	-	-	-	-	-	2	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tapeinosoma	1	3	30	73	47	20	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tauberae	-	-	-	-	-	-	-	-	-	-	1	3	2	18	23	16	2	1	-	-	-	-	-	-	-	-	-	-
Ps. viridis	-	-	-	-	-	-	1	4	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. wilsoni	-	-	-	-	-	-	-	-	-	-	-	2	10	26	37	33	12	4	2	-	-	-	-	-	-	-	-	-

Appendix Table 1d. (continued)

	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
Ad. desmonotus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
As. punctatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. purpurascens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. zaps	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. atrofasciatus	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. cyclophthalmus	9	14	22	19	34	26	24	15	4	10	5	1	2	1	-	-	-	-	-	-
L. lineatus	-	-	-	-	-	-	1	-	2	4	7	13	9	14	8	12	8	4	2	1
M. alleni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. paranox	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. polynemus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. splendens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. winterbottomi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Og. novaehollandiae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Og. queenslandiae	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Og. salvati	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ox. veliferus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ph. marginata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. aurifrons	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. coralensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. diadema	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. ephippiata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. paccagnellae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. porphyrea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aldabraensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. alticaudex	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. andamanensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aureolineatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aurulentus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. bitaeniatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. caudalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. coccinicauda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. colei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cometes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cyanotaenia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dilectus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dixurus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dutoiti	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. elongatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flammicauda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavivertex	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavopunctatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fowleri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fridmani	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fuscus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. howsoni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. jamesi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kolythrus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kristinae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. leucorhynchus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. linda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. litus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. luteus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. madagascariensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. magnificus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. marshallensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melanurus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. mooii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. moorei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. natalensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. nigrovittatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. olivaceus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. omanensis	1	-	4	6	4	2	4	2	-	3	-	-	1	-	-	-	-	-	-	-
Ps. persicus	14	8	11	9	6	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. perspicillatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pesi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pictus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. punctatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pylei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. quinquedentatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. ransonneti	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. reticulatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. sankeyi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. springeri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. steenei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. striatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tapeinosoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tauberae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. viridis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. wilsoni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix Table 1e. Anterior lateral-line scales (including bilateral counts).

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Ad. desmonotus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	11	27	33	21	11	3	-	-	-
As. punctatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	5	14	9	21	26	20	11	7
C. purpurascens	-	-	-	-	-	-	-	-	2	5	17	26	32	25	17	4	3	1	-	-	-	-	-	-	-	-	-	-
C. zaps	-	-	-	-	-	-	-	-	-	2	6	29	20	20	8	1	2	-	-	-	-	-	-	-	-	-	-	-
L. atrofasciatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. cyclophthalmus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. lineatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. alleni	-	-	-	-	-	-	-	-	-	1	-	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
M. paranox	-	-	-	-	-	-	-	1	-	-	2	5	3	7	4	5	2	1	2	1	-	-	-	-	-	-	-	-
M. polynemus	-	-	-	1	1	-	-	-	-	-	-	-	3	4	1	-	2	2	-	-	-	-	-	-	-	-	-	-
M. splendens	-	-	-	-	-	-	-	-	1	1	3	8	10	8	6	1	4	2	-	-	-	-	-	-	-	-	-	-
M. winterbottomi	-	-	-	-	-	-	-	-	-	1	1	-	3	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-
Og. novaehollandiae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2	5
Og. queenslandiae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	8	9	18
Og. salvati	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	4	8	9	15
Ox. veliferus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	1	-	7	8	6	3	3	-	-	-
Ph. marginata	-	-	-	-	1	1	-	1	5	6	8	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. aurifrons	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. coralensis	-	-	-	-	-	-	1	7	20	20	21	16	7	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. diadema	-	-	-	-	2	5	8	7	7	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. ephippiata	-	-	-	-	-	-	1	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. paccagnellae	-	-	1	1	1	4	13	24	30	26	21	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. porphyrea	-	-	-	-	3	2	10	18	7	17	9	5	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aldabraensis	-	-	-	-	-	-	-	-	-	8	7	21	28	36	25	12	11	9	3	-	-	-	-	-	-	-	-	-
Ps. alticaudex	-	-	-	1	2	8	20	19	11	2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. andamanensis.	-	-	-	-	-	-	-	-	-	5	9	19	20	14	7	1	3	1	-	-	-	-	-	-	-	-	-	-
Ps. aureolineatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	1	-	-	-	-	-	-	-
Ps. aurulentus	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	2	-	1	-	-	-	-	-	-	-	-	-	-
Ps. bitaeniatus	-	-	-	-	-	-	-	-	-	-	-	-	3	4	12	15	13	8	5	1	2	-	-	-	-	-	-	-
Ps. caudalis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	6	8	10	7	6	5
Ps. coccinicauda	-	-	-	-	-	-	-	-	-	-	-	-	-	4	7	12	17	12	4	2	-	-	-	-	-	-	-	-
Ps. colei	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cometes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-
Ps. cyanotaenia	-	-	-	-	-	-	-	-	1	9	30	49	60	49	25	5	2	-	-	-	-	-	-	-	-	-	-	-
Ps. dilectus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	6	6	9	6	-	-	-
Ps. dixurus	-	-	-	-	-	-	-	-	-	-	-	1	2	6	5	3	3	2	1	1	-	-	-	-	-	-	-	-
Ps. dutoiti	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6	6	9	11	10	-	-	-	-	-	-	-	-
Ps. elongatus	-	-	-	-	-	-	-	1	3	8	18	6	3	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flammicauda	-	-	-	-	-	-	-	-	-	1	2	2	18	18	7	2	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavivertex	-	-	-	-	-	-	-	-	1	1	3	6	10	14	9	10	5	2	2	-	-	-	-	-	-	-	-	-
Ps. flavopunctatus	-	-	-	-	-	-	-	-	-	-	1	-	3	4	1	4	2	-	-	-	-	-	-	-	-	-	-	-
Ps. fowleri	-	-	-	-	-	1	2	2	6	12	14	7	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fridmani	-	-	-	-	-	-	-	-	1	8	7	5	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fuscus	-	-	1	-	-	-	3	1	1	9	18	18	42	40	47	83	46	35	13	4	5	1	-	-	-	-	-	-
Ps. howsoni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	6	7	10	7	9	3	1	-	-
Ps. jamesi	-	-	-	-	-	-	-	-	-	-	-	-	1	11	16	15	13	3	2	3	-	-	-	-	-	-	-	-
Ps. kolythrus	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kristinae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	10	14	24	11	5	-	-	-	-	-	-	-
Ps. leucorhynchus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	9	7	4	3	2	5	-	-	-	-	-	-
Ps. linda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	11	17	11	10	12	13	4	-	-	-	-
Ps. litus	-	-	-	-	-	-	-	-	-	-	1	2	1	2	2	1	2	1	-	-	-	-	-	-	-	-	-	-
Ps. luteus	-	-	-	-	-	-	-	-	-	-	-	3	3	7	9	8	9	5	-	-	-	-	-	-	-	-	-	-
Ps. madagascariensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	4	3	1	-	-	-	-	-	-
Ps. magnificus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	15	13	13	7	1	-	-	-	-	-	-
Ps. marshallensis	-	-	-	-	-	-	-	1	1	6	25	34	50	51	40	20	12	2	-	-	-	-	-	-	-	-	-	-
Ps. melanurus	-	-	-	-	-	-	-	-	6	15	22	17	9	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melas	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	6	11	9	17	4	4	-	1	-	-	-	-	-
Ps. mooii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-
Ps. moorei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	1	1	4	1	-	1	-	-	-
Ps. natalensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	17	20	15	13	10	2	1	-
Ps. nigrovittatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	5	5	4	12	11	4	-	1	-	-
Ps. olivaceus	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	3	9	19	24	23	13	9	6	-	-	-	-	-
Ps. omanensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. persicus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Ps. perspicillatus	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	2	6	10	12	10	3	-	-	-	-	-	-	-
Ps. pesi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	6	5	4	2	-	-	-	-	-	-	-	-	-
Ps. pictus	-	-	-	-	-	-	-	-	-	2	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. punctatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	2	2	-	-	-	-	-	-	-
Ps. pylei	-	-	-	-	-	-	-	-	-	-	-	1	3	3	6	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. quinquedentatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	6	13	22	16	10	7	3	-	-
Ps. ransonneti	-	-	-	-	-	-	-	-	-	-	1	2	5	6	6	12	7	3	-	-	-	-	-	-	-	-	-	-
Ps. reticulatus	-	-	-	-	-	-	-	-	-	-	1	4	4	1	1	2	1	-	-	-	-	-	-	-	-	-	-	-
Ps. sankeyi	-	-	-	-	-	-	-	-	-	-	1	6	1	4	3	3	1	-	-	-	-	-	-	-	-	-	-	-
Ps. springeri	2	-	1	3	4	2	6	10	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. steenei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	3	1	3	2	-	-	-	-	-
Ps. striatus	-	-	2	-	-	-	-	-	1	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tapeinosoma	-	-	-	-	-	1	2	9	38	48	42	13	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tauberae	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	2	3	14	14	11	7	2	1	-	-	-	-	-
Ps. viridis	-	-	-	-	-	-	-	-	-	-	-	1	2	1	-	3	-	-	-	-	-	-	-	-	-	-	-	-
Ps. wilsoni	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	5	13	23	30	27	13	4	1	-	-	-	-	-

Appendix Table 1e. (continued)

	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67
Ad. desmonotus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
As. punctatus	5	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. purpurascens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. zaps	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. atrofasciatus	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. cyclophthalmus	1	-	2	8	7	13	14	19	18	25	23	24	13	10	5	4	3	1	1	1	-	-	-	-	-
L. lineatus	-	-	-	-	-	-	-	-	-	-	1	-	4	1	7	10	4	14	9	9	5	5	6	2	2
M. alleni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. paranox	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. polynemus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. splendens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. winterbottomi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Og. novaehollandiae	5	8	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Og. queenslandiae	11	3	7	1	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Og. salvati	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ox. veliferus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ph. marginata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. aurifrons	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. coralensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. diadema	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. ephippiatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. paccagnellae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. porphyreus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aldabraensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. alticaudex	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. andamanensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aureolineatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aurulentus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. bitaeniatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. caudalis	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. coccinicauda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. colei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cometes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cyanotaenia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dilectus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dixurus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dutoiti	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. elongatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flammicauda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavivertex	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavopunctatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fowleri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fridmani	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fuscus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. howsoni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. jamesi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kolythrus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kristinae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. leucorhynchus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. linda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. litus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. luteus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. madagascariensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. magnificus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. marshallensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melanurus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melas	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. mooii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. moorei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. natalensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. nigrovittatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. olivaceus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. omanensis	-	-	-	-	-	-	2	3	6	4	2	3	3	2	2	-	-	1	-	-	-	-	-	-	-
Ps. persicus	1	-	1	5	6	7	14	5	10	7	1	2	2	2	-	-	-	-	-	-	-	-	-	-	-
Ps. perspicillatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pesi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pictus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. punctatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pylei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. quinquedentatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. ransonneti	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. reticulatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. sankeyi	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. springeri	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. steenei	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. striatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tapeinosoma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tauberae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. viridis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. wilsoni	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix Table 1f. Anterior lateral-line termination relative to segmented dorsal-fin rays (including bilateral counts).

	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Ad. desmonotus	-	-	-	-	-	-	-	1	4	52	37	18	1	1	-	-	-	-	-	-	-	-	-	-	-
As. punctatus	-	-	-	-	-	-	-	-	7	24	54	29	6	2	-	-	-	-	-	-	-	-	-	-	-
C. purpurascens	-	-	-	-	-	-	2	12	28	32	39	18	4	-	-	-	-	-	-	-	-	-	-	-	-
C. zaps	-	-	-	-	-	-	-	5	27	26	27	4	1	1	-	-	-	-	-	-	-	-	-	-	-
L. atrofasciatus	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-
L. cyclophthalmus	-	-	-	-	-	-	-	-	-	1	16	42	77	41	8	1	-	-	-	-	-	-	-	-	-
L. lineatus	-	-	-	-	-	-	-	-	-	-	-	13	19	22	22	1	1	-	-	-	-	-	-	-	-
M. alleni	-	-	-	-	-	-	-	1	-	2	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-
M. paranox	-	-	-	-	-	-	-	1	4	4	9	3	5	4	2	2	-	-	-	-	-	-	-	-	-
M. polynemus	-	-	-	-	-	2	-	-	-	-	-	1	3	4	1	1	1	-	1	-	-	-	-	-	-
M. splendens	-	-	-	-	-	-	-	-	1	4	15	7	6	2	4	1	1	1	-	-	-	-	-	-	-
M. winterbottomi	-	-	-	-	-	-	-	-	-	1	3	1	-	2	-	2	-	-	-	-	-	-	-	-	-
Og. novaehollandiae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	6	4	9	4	2
Og. queenslandiae	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	13	14	16	12	5	1	-	-
Og. salvati	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	16	10	8	6	-	-	-	-
Ox. veliferus	-	-	-	-	-	1	1	1	10	13	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ph. marginata	-	-	-	-	-	1	1	-	3	6	10	3	3	-	-	-	-	-	-	-	-	-	-	-	-
Pi. aurifrons	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. coralensis	-	-	2	3	24	48	12	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. diadema	-	-	2	-	7	19	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. ephippiata	-	-	-	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. paccagnellae	-	-	-	3	19	48	35	20	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. porphyrea	-	-	-	6	13	18	21	16	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aldabraensis	-	-	-	-	-	-	-	3	17	26	29	42	22	19	4	-	-	-	-	-	-	-	-	-	-
Ps. alticaudex	-	-	2	1	8	22	25	6	4	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. andamanensis	-	-	-	-	-	-	-	10	17	25	17	8	2	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aureolineatus	-	-	-	-	-	-	-	-	-	-	-	2	1	1	-	-	-	-	-	-	-	-	-	-	-
Ps. aurulentus	-	-	-	-	-	-	-	-	-	-	1	-	1	3	1	-	-	-	-	-	-	-	-	-	-
Ps. bitaeniatus	-	-	-	-	-	2	6	15	20	9	5	6	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. caudalis	-	-	-	-	-	-	-	-	-	-	-	-	2	7	7	14	15	4	-	-	-	-	-	-	-
Ps. coccinicauda	-	-	-	-	-	-	-	-	-	3	12	25	13	2	1	-	-	-	-	-	-	-	-	-	-
Ps. colei	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cometes	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cyanotaenia	-	-	-	-	-	-	-	2	10	67	87	41	16	1	-	-	-	-	-	-	-	-	-	-	-
Ps. dilectus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	10	10	9	2	-	-	-	-	-	-
Ps. dixurus	-	-	-	-	-	-	1	-	4	7	7	4	1	1	-	-	-	-	-	-	-	-	-	-	-
Ps. dutoiti	-	-	-	-	-	-	-	-	-	-	1	7	9	13	10	1	1	-	-	-	-	-	-	-	-
Ps. elongatus	-	-	-	-	-	1	5	15	11	7	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flammicauda	-	-	-	-	-	-	2	7	14	17	7	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavivertex	-	-	-	-	-	2	3	7	16	15	15	5	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavopunctatus	-	-	-	-	-	-	-	-	-	-	1	5	5	4	-	1	-	-	-	-	-	-	-	-	-
Ps. fowleri	-	-	-	-	-	4	3	12	18	6	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fridmani	-	-	-	-	-	7	7	11	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fuscus	1	1	-	-	-	4	5	11	39	81	88	80	35	14	3	-	-	-	-	-	-	-	-	-	-
Ps. howsoni	-	-	-	-	-	-	-	-	-	-	-	1	7	9	18	10	5	-	-	-	-	-	-	-	-
Ps. jamesi	-	-	-	-	-	-	-	-	-	-	-	5	9	18	18	6	6	2	-	-	-	-	-	-	-
Ps. kolythrus	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kristinae	-	-	-	-	-	-	-	-	2	3	7	22	18	14	2	-	-	-	-	-	-	-	-	-	-
Ps. leucorhynchus	-	-	-	-	-	-	-	-	-	-	2	-	8	9	7	6	1	-	-	-	-	-	-	-	-
Ps. linda	-	-	-	-	-	-	-	-	-	1	15	21	22	14	7	4	-	-	-	-	-	-	-	-	-
Ps. litus	-	-	-	-	-	-	-	-	-	1	2	4	2	1	2	-	-	-	-	-	-	-	-	-	-
Ps. luteus	-	-	-	-	-	-	-	-	-	1	-	-	6	16	12	7	1	-	-	-	-	-	-	-	-
Ps. madagascariensis	-	-	-	-	-	-	-	-	-	1	-	4	5	-	-	-	-	-	-	-	-	-	-	-	-
Ps. magnificus	-	-	-	-	-	-	-	-	1	7	22	17	4	1	-	-	-	-	-	-	-	-	-	-	-
Ps. marshallensis	-	-	-	-	-	1	16	34	57	67	44	21	11	1	-	-	-	-	-	-	-	-	-	-	-
Ps. melanurus	-	-	-	-	-	-	-	1	12	26	31	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melas	-	-	-	-	-	-	-	1	1	2	19	15	13	1	1	-	-	-	-	-	-	-	-	-	-
Ps. mooii	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-
Ps. moorei	-	-	-	-	-	-	-	-	-	-	-	-	2	2	5	1	2	-	-	-	-	-	-	-	-
Ps. natalensis	-	-	-	-	-	-	-	-	-	-	-	4	13	31	23	11	-	-	-	-	-	-	-	-	-
Ps. nigrovittatus	-	-	-	-	-	-	-	-	-	-	1	3	12	19	9	1	-	-	-	-	-	-	-	-	-
Ps. olivaceus	-	-	-	-	-	-	-	-	2	5	11	32	27	26	4	1	-	-	-	-	-	-	-	-	-
Ps. omanensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	6	12	6	-	-	-	-
Ps. persicus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	9	17	23	6	2	-	-	-	-
Ps. perspicillatus	-	-	-	-	-	-	-	2	6	12	12	11	5	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pesi	-	-	-	-	-	-	-	-	1	5	9	8	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pictus	-	-	-	-	-	-	-	-	-	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. punctatus	-	-	-	-	-	-	-	-	-	-	-	2	3	3	-	-	-	-	-	-	-	-	-	-	-
Ps. pylei	-	-	-	-	-	-	-	-	-	-	1	1	5	4	3	-	-	-	-	-	-	-	-	-	-
Ps. quinquedentatus	-	-	-	-	-	-	-	-	-	-	-	1	-	22	29	16	11	-	1	-	-	-	-	-	-
Ps. ransonneti	-	-	-	-	-	-	-	4	7	8	10	8	3	1	-	-	-	-	-	-	-	-	-	-	-
Ps. reticulatus	-	-	-	-	-	-	-	-	-	-	1	3	5	2	2	-	1	-	-	-	-	-	-	-	-
Ps. sankeyi	-	-	-	-	-	-	-	4	7	4	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. springeri	-	-	1	1	3	7	8	11	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. steenei	-	-	-	-	-	-	-	-	-	-	1	1	5	3	2	-	-	-	-	-	-	-	-	-	-
Ps. striatus	-	-	2	-	-	-	1	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tapeinosoma	-	-	-	-	-	-	-	8	31	80	31	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tauberae	-	-	-	-	-	-	-	-	-	-	-	3	3	15	19	13	2	2	-	-	-	-	-	-	-
Ps. viridis	-	-	-	-	-	-	-	-	-	-	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. wilsoni	-	-	-	-	-	-	-	-	1	6	29	40	33	7	1	-	-	-	-	-	-	-	-	-	-

Appendix Table 1g. Posterior lateral-line scales (including bilateral counts).

	Peduncular scales																													Caudal fin scales				
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	0	1	2	3	4
Ad. desmonotus	-	1	2	1	5	8	25	23	27	17	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55	47	5	-	-
As. punctatus	-	-	-	-	-	3	18	45	33	11	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38	57	9	-	-
C. purpurascens	-	-	-	1	8	26	57	21	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	57	23	1	-
C. zaps	-	-	-	1	-	2	9	33	24	6	1	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	45	6	-	-
L. atrofasciatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
L. cyclophthalmus	-	-	-	-	-	-	-	-	-	-	-	-	1	4	1	3	4	9	33	31	48	24	19	5	4	-	-	-	-	-	-	9	148	15	2
L. lineatus	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	1	1	2	3	18	11	16	11	8	3	2	-	-	-	1	-	10	41	8	-
M. alleni	-	-	-	-	-	-	1	1	1	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	2	-	-	-
M. paranox	2	-	-	-	-	1	2	2	1	9	3	3	4	1	3	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	15	6	9	4	-
M. polynemus	1	-	-	-	-	-	-	-	2	2	2	-	-	1	-	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	1	5	5	-	-
M. splendens	-	-	-	-	-	2	-	1	2	7	8	7	6	4	2	2	-	1	1	-	-	-	-	-	-	-	-	-	-	-	9	18	12	3	-
M. winterbottomi	-	-	-	-	-	-	-	3	1	1	1	-	1	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5	1	-
Og. novaehollandiae	-	-	-	-	-	-	-	1	4	8	5	2	3	3	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	15	4	-
Og. queenslandiae	-	-	-	-	2	-	-	-	4	2	14	3	14	4	7	3	3	-	1	-	-	-	-	-	-	-	-	-	-	-	5	9	26	5	-
Og. salvati	-	-	-	-	-	9	6	3	10	4	-	7	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	36	-	-
Ox. veliferus	-	-	-	-	-	-	1	2	5	2	16	2	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	14	1	-	-
Ph. marginata	-	-	-	-	-	-	-	-	-	2	20	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	2	13	5	-
Pi. aurifrons	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
Pi. coralensis	7	-	1	3	20	35	10	9	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	95	-	-	-	-
Pi. diadema	-	-	1	4	2	7	9	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	-	-	-	-
Pi. ephippiata	-	-	-	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-
Pi. paccagnellae	5	-	1	4	6	28	41	27	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	117	4	-	-	-
Pi. porphyrea	6	1	-	-	6	19	20	15	4	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70	3	-	-	-
Ps. aldabraensis	-	-	-	-	2	8	104	15	16	3	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	125	16	1	-	-
Ps. alticaudex	-	-	-	-	-	-	5	14	15	14	7	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	28	4	-	-
Ps. andamanensis	-	1	-	-	-	1	11	36	7	7	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	36	31	5	-	-
Ps. aureolineatus	-	-	-	-	-	3	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	-	-	-
Ps. aurulentus	-	-	-	-	-	-	1	-	-	1	2	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-
Ps. bitaeniatus	1	-	1	1	-	1	2	6	10	11	11	7	6	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	16	13	-	-
Ps. caudalis	-	-	-	-	-	-	-	4	1	5	3	21	2	7	-	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	8	34	1	-
Ps. coccinicauda	-	-	-	-	-	-	-	4	19	23	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	31	8	-	-
Ps. colei	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	not known				
Ps. cometes	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
Ps. cyanotaenia	-	-	-	-	-	-	6	41	93	56	15	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31	153	20	-	-
Ps. dilectus	1	-	-	-	2	1	1	4	13	7	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	9	16	1	-
Ps. dixurus	-	-	-	-	-	-	2	7	4	8	1	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	5	7	-	-
Ps. dutoiti	-	-	-	-	1	1	27	1	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	2	-	-	-
Ps. elongatus	1	-	1	1	2	7	18	3	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27	13	1	-	-
Ps. flammicauda	-	-	-	-	2	5	13	8	7	9	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49	-	-	-	-
Ps. flavivertex	4	1	-	-	8	19	3	13	1	8	-	1	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	38	8	4	1	-

Appendix Table 1g. (continued)

	Peduncular scales																													Caudal fin scales				
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	0	1	2	3	4
Ps. flavopunctatus	-	-	-	-	-	1	4	10	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	7	-	-	-
Ps. fowleri	-	-	-	-	1	-	11	15	13	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	28	1	-	-
Ps. fridmani	-	-	4	5	12	7	5	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26	6	-	-	-
Ps. fuscus	-	-	-	-	2	9	26	61	99	50	48	60	8	9	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	74	164	90	12	-
Ps. howsoni	-	-	-	-	-	-	9	12	6	13	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	27	2	-	-
Ps. jamesi	-	-	-	-	2	4	8	36	5	3	3	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	50	5	3	1	-
Ps. kolythrus	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
Ps. kristinae	1	-	-	1	-	4	1	2	30	11	12	7	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	11	38	5	-
Ps. leucorhynchus	-	-	-	-	-	3	1	11	1	11	-	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	23	5	-	-
Ps. linda	2	-	-	-	-	1	-	2	7	1	6	16	6	6	20	3	2	-	1	-	-	-	-	-	-	-	-	-	-	-	15	25	33	-	-
Ps. litus	-	-	-	-	-	-	-	6	1	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	10	1	-	-
Ps. luteus	-	-	-	-	-	1	6	21	11	1	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	9	2	-	-
Ps. madagascariensis	1	1	-	-	-	1	2	-	1	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	1	-
Ps. magnificus	-	-	1	-	-	2	9	13	9	8	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	45	1	-	-	-
Ps. marshallensis	2	-	-	1	-	3	15	71	75	34	14	5	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	67	108	23	1	-
Ps. melanurus	-	-	-	-	1	2	15	31	14	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	40	1	-	-
Ps. melas	-	-	1	-	-	8	-	10	17	1	2	9	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	26	6	-	-
Ps. mooii	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	not known				
Ps. moorei	-	-	-	-	-	-	-	2	-	5	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	6	1	-	-
Ps. natalensis	-	-	-	-	-	2	7	5	23	20	16	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	25	36	1	-
Ps. nigrovittatus	-	-	-	-	-	5	-	6	5	15	4	3	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19	20	2	1	-
Ps. olivaceus	-	-	-	-	-	3	-	-	18	6	9	38	5	9	13	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	43	33	3	-
Ps. omanensis	-	-	-	-	-	1	-	2	-	3	5	13	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	23	-	-
Ps. persicus	-	-	-	-	-	-	-	1	-	8	4	27	4	10	1	7	-	1	-	-	-	-	-	-	-	-	-	-	-	-	6	15	39	-	-
Ps. perspicillatus	-	-	-	1	1	-	1	-	7	6	7	17	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	25	8	-	-
Ps. pesi	-	-	-	2	-	8	1	3	10	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	9	3	-	-
Ps. pictus	-	-	-	-	-	-	2	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	-	-	-
Ps. punctatus	-	-	-	-	-	1	-	1	3	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6	1	-	-
Ps. pylei	-	-	-	-	-	-	-	9	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	6	4	-	-
Ps. quinquedentatus	-	-	-	-	1	-	14	29	16	13	5	2	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	41	-	-	-
Ps. ransonneti	-	-	-	-	-	-	1	3	3	8	20	2	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	20	9	-	-
Ps. reticulatus	-	-	-	-	-	-	5	8	1	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	9	-	-	-
Ps. sankeyi	1	-	1	1	4	-	3	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	3	-	-
Ps. springeri	14	-	-	2	3	8	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35	-	-	-	-
Ps. steenei	-	-	-	-	-	-	1	2	2	2	1	2	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	3	-	-
Ps. striatus	1	-	-	-	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	1	-	-	-
Ps. tapeinosoma	-	-	-	-	2	6	42	53	29	6	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34	91	8	-	-
Ps. tauberae	-	-	-	-	1	5	1	6	27	2	4	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	7	28	10	-
Ps. viridis	-	-	-	-	-	-	-	4	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	2	-	-	-
Ps. wilsoni	-	-	-	-	-	-	1	12	20	16	36	5	11	11	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	51	55	7	-	-

Appendix Table 1h. Horizontal scale rows below and above anterior lateral line (including bilateral counts).

	Scales below anterior lateral line																	Scales above anterior lat.line						
	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	1	2	3	4	5	6	7
Ad. desmonotus	-	-	-	-	15	39	50	12	-	-	-	-	-	-	-	-	-	-	70	46	-	-	-	-
As. punctatus	-	-	-	7	31	64	21	3	-	-	-	-	-	-	-	-	-	1	99	25	1	-	-	-
C. purpurascens	-	-	9	91	33	5	-	-	-	-	-	-	-	-	-	-	-	-	18	112	10	-	-	-
C. zaps	-	-	10	61	19	2	-	-	-	-	-	-	-	-	-	-	-	-	23	66	3	-	-	-
L. atrofasciatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	2	-	-
L. cyclophthalmus	-	-	-	-	-	-	-	-	-	5	23	59	54	45	6	-	1	-	-	5	104	83	2	-
L. lineatus	-	-	-	-	-	-	-	3	14	39	23	10	-	-	-	-	-	-	-	12	59	12	-	-
M. alleni	-	-	-	2	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-
M. paranox	-	-	-	-	1	10	23	5	2	-	-	-	-	-	-	-	-	-	-	32	9	-	-	-
M. polynemus	-	-	-	-	10	2	-	-	-	-	-	-	-	-	-	-	-	-	-	7	5	-	-	-
M. splendens	-	-	2	20	22	2	-	-	-	-	-	-	-	-	-	-	-	-	4	34	8	-	-	-
M. winterbottomi	-	-	-	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	3	-	-	-
Og. novaehollandiae	-	-	-	-	-	-	-	-	5	11	18	-	-	-	-	-	-	-	4	27	3	-	-	-
Og. queenslandiae	-	-	-	-	-	-	-	-	-	3	9	18	26	8	1	-	-	-	-	42	20	3	-	-
Og. salvati	-	-	-	-	-	7	20	19	-	-	-	-	-	-	-	-	-	-	39	7	-	-	-	-
Ox. veliferus	-	-	-	-	-	-	-	-	11	17	5	1	-	-	-	-	-	-	3	29	2	-	-	-
Ph. marginata	-	-	-	18	15	-	-	-	-	-	-	-	-	-	-	-	-	-	3	22	8	-	-	-
Pi. aurifrons	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
Pi. coralensis	-	-	-	44	58	5	1	-	-	-	-	-	-	-	-	-	-	1	86	20	-	-	-	-
Pi. diadema	-	-	6	21	6	-	-	-	-	-	-	-	-	-	-	-	-	1	31	1	-	-	-	-
Pi. ephippiata	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	-	-	-	-
Pi. paccagnellae	-	1	17	99	20	-	-	-	-	-	-	-	-	-	-	-	-	3	113	20	-	-	-	-
Pi. porphyrea	-	-	3	50	31	-	-	-	-	-	-	-	-	-	-	-	-	1	71	15	-	-	-	-
Ps. aldabraensis	-	-	-	-	3	50	90	22	3	-	-	-	-	-	-	-	-	-	23	131	14	-	-	-
Ps. alticaudex	-	-	2	47	28	1	-	-	-	-	-	-	-	-	-	-	-	-	2	67	9	-	-	-
Ps. andamanensis	-	-	-	17	51	11	1	-	-	-	-	-	-	-	-	-	-	-	14	64	1	-	-	-
Ps. aureolineatus	-	-	-	-	2	2	2	-	-	-	-	-	-	-	-	-	-	-	-	5	-	-	-	-
Ps. aurulentus	-	-	-	1	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-
Ps. bitaeniatus	-	-	-	-	1	39	33	-	-	-	-	-	-	-	-	-	-	-	10	63	3	-	-	-
Ps. caudalis	-	-	-	-	-	-	29	18	3	-	-	-	-	-	-	-	-	-	-	38	14	-	-	-
Ps. coccinicauda	-	-	4	41	14	1	-	-	-	-	-	-	-	-	-	-	-	-	39	21	-	-	-	-
Ps. colei	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-
Ps. cometes	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
Ps. cyanotaenia	1	55	125	50	9	-	-	-	-	-	-	-	-	-	-	-	-	-	178	63	-	-	-	-
Ps. dilectus	-	-	-	-	-	1	10	19	6	-	-	-	-	-	-	-	-	-	2	32	2	-	-	-
Ps. dixurus	-	-	-	-	-	3	12	9	2	-	-	-	-	-	-	-	-	-	2	24	2	-	-	-
Ps. dutoiti	-	-	-	3	13	22	12	1	-	-	-	-	-	-	-	-	-	-	2	43	7	-	-	-
Ps. elongatus	-	-	8	33	5	-	-	-	-	-	-	-	-	-	-	-	-	-	43	3	-	-	-	-
Ps. flammicauda	-	-	-	2	22	36	6	-	-	-	-	-	-	-	-	-	-	-	23	37	2	-	-	-
Ps. flavivertex	-	-	-	-	-	15	48	4	-	-	-	-	-	-	-	-	-	-	15	48	4	-	-	-
Ps. flavopunctatus	-	4	9	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	10	-	-	-	-
Ps. fowleri	-	-	1	48	3	-	-	-	-	-	-	-	-	-	-	-	-	-	7	44	1	-	-	-
Ps. fridmani	-	-	5	26	17	-	-	-	-	-	-	-	-	-	-	-	-	-	19	27	-	-	-	-
Ps. fuscus	-	-	-	1	33	102	167	54	2	1	-	-	-	-	-	-	-	-	4	179	180	16	-	-
Ps. howsoni	-	-	-	-	3	22	33	1	1	-	-	-	-	-	-	-	-	-	18	36	3	-	-	-
Ps. jamesi	-	-	-	13	42	11	-	-	-	-	-	-	-	-	-	-	-	-	18	47	1	-	-	-
Ps. kolythrus	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
Ps. kristinae	-	-	-	2	13	36	23	-	-	-	-	-	-	-	-	-	-	-	2	62	8	-	-	-
Ps. leucorhynchus	-	-	-	2	8	10	16	2	-	-	-	-	-	-	-	-	-	-	5	30	2	-	-	-
Ps. linda	-	-	-	-	-	-	-	5	17	35	19	11	1	-	-	-	-	-	-	8	47	30	3	-
Ps. litus	-	-	-	3	8	1	-	-	-	-	-	-	-	-	-	-	-	-	4	6	1	1	-	-
Ps. luteus	-	-	2	22	23	4	-	-	-	-	-	-	-	-	-	-	-	-	19	30	-	-	-	-
Ps. madagascariensis	-	-	-	-	3	4	3	-	-	-	-	-	-	-	-	-	-	-	-	8	2	-	-	-
Ps. magnificus	-	-	-	1	27	20	4	-	-	-	-	-	-	-	-	-	-	-	3	48	1	-	-	-
Ps. marshallensis	-	-	15	149	82	9	-	-	-	-	-	-	-	-	-	-	-	-	22	215	19	-	-	-
Ps. melanurus	-	16	52	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55	23	-	-	-	-
Ps. melas	-	-	-	-	4	17	32	8	3	-	-	-	-	-	-	-	-	-	8	56	1	-	-	-
Ps. mooii	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
Ps. moorei	-	-	-	-	-	9	3	-	-	-	-	-	-	-	-	-	-	-	-	11	1	-	-	-
Ps. natalensis	-	-	-	-	3	34	51	2	-	-	-	-	-	-	-	-	-	-	-	82	8	-	-	-
Ps. nigrovittatus	-	-	-	-	2	10	36	7	-	-	-	-	-	-	-	-	-	-	15	38	2	-	-	-
Ps. olivaceus	-	-	-	-	-	-	2	22	47	34	5	-	-	-	-	-	-	-	-	6	62	37	3	2
Ps. omanensis	-	-	-	-	-	-	5	17	5	1	-	-	-	-	-	-	-	-	3	22	3	-	-	-
Ps. persicus	-	-	-	-	-	-	2	9	41	13	-	-	-	-	-	-	-	-	10	52	3	-	-	-
Ps. perspicillatus	-	-	-	-	-	2	11	17	16	2	-	-	-	-	-	-	-	-	-	41	7	-	-	-
Ps. pesi	-	-	-	-	4	14	15	1	-	-	-	-	-	-	-	-	-	-	-	34	1	-	-	-
Ps. pictus	-	-	-	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-
Ps. punctatus	-	-	-	1	5	4	-	-	-	-	-	-	-	-	-	-	-	-	2	8	-	-	-	-
Ps. pylei	-	-	-	2	12	-	-	-	-	-	-	-	-	-	-	-	-	-	3	10	1	-	-	-
Ps. quinquedentatus	-	-	-	-	8	44	42	2	-	-	-	-	-	-	-	-	-	-	16	76	4	-	-	-
Ps. ransonneti	-	-	-	17	26	5	-	-	-	-	-	-	-	-	-	-	-	-	7	39	2	-	-	-
Ps. reticulatus	-	-	-	7	13	4	-	-	-	-	-	-	-	-	-	-	-	-	18	6	-	-	-	-
Ps. sankeyi	-	-	-	-	-	18	25	3	-	-	-	-	-	-	-	-	-	-	20	21	-	-	-	-
Ps. springeri	-	-	2	25	12	3	-	-	-	-	-	-	-	-	-	-	-	-	1	22	16	2	-	-
Ps. steenei	-	-	-	-	2	6	4	-	-	-	-	-	-	-	-	-	-	-	-	11	1	-	-	-
Ps. striatus	6	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	7	-	-	-	-	-
Ps. tapeinosoma	-	107	64	3	-	-	-	-	-	-	-	-	-	-	-	-	-	9	149	13	-	-	-	-
Ps. tauberae	-	-	-	-	6	26	33	-	-	-	-	-	-	-	-	-	-	-	1	55	9	-	-	-
Ps. viridis	-	-	5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	1	-	-	-	-
Ps. wilsoni	-	-	-	-	1	21	76	26	2	-	-	-	-	-	-	-	-	-	2	104	20	-	-	-

Appendix Table 1i. Total horizontal scale rows above anal-fin origin, and scale rows between lateral lines (including bilateral counts).

	Total horizontal scale rows above anal-fin origin																					Scales betw. lat. lines					
	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	2	3	4	5	6	7
Ad. desmonotus	-	-	-	-	-	14	34	26	36	8	-	-	-	-	-	-	-	-	-	-	-	-	-	20	67	26	1
As. punctatus	-	-	-	-	7	31	50	24	13	1	-	-	-	-	-	-	-	-	-	-	-	-	19	96	8	-	-
C. purpurascens	-	-	-	1	22	72	36	7	-	-	-	-	-	-	-	-	-	-	-	-	-	2	109	22	-	-	-
C. zaps	-	-	-	2	19	55	14	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	79	7	-	-	-
L. atrofasciatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	2
L. cyclophthalmus	-	-	-	-	-	-	-	-	-	-	-	-	2	16	46	58	44	24	3	1	-	-	-	8	163	15	2
L. lineatus	-	-	-	-	-	-	-	-	-	-	7	14	28	19	11	4	-	-	-	-	-	-	-	46	28	3	-
M. alleni	-	-	-	-	-	2	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	3	-	-	-
M. paranox	-	-	-	-	-	-	-	10	18	12	2	-	-	-	-	-	-	-	-	-	-	-	2	23	9	-	-
M. polynemus	-	-	-	-	-	-	6	5	1	-	-	-	-	-	-	-	-	-	-	-	-	1	5	8	-	-	-
M. splendens	-	-	-	-	4	17	18	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	17	26	-	-	-
M. winterbottomi	-	-	-	-	-	4	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	5	-	-	-
Og. novaehollandiae	-	-	-	-	-	-	-	-	-	-	7	11	13	3	-	-	-	-	-	-	-	-	-	14	13	-	-
Og. queenslandiae	-	-	-	-	-	-	-	-	-	-	-	3	4	15	22	14	4	2	-	-	-	-	-	-	31	31	1
Og. salvati	-	-	-	-	-	-	6	17	19	3	-	-	-	-	-	-	-	-	-	-	-	-	-	38	4	1	-
Ox. veliferus	-	-	-	-	-	-	-	-	-	1	12	14	5	2	-	-	-	-	-	-	-	-	-	1	10	20	-
Ph. marginata	-	-	-	-	-	14	16	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1	26	-	-	-	-
Pi. aurifrons	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-
Pi. coralensis	-	-	-	1	36	51	18	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	90	-	-	-
Pi. diadema	-	-	-	5	22	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	29	-	-	-
Pi. ephippiata	-	-	-	-	-	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	-	-
Pi. paccagnellae	-	-	2	19	85	25	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	111	1	-	-
Pi. porphyrea	-	-	-	4	40	35	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	66	1	-	-
Ps. aldabraensis	-	-	-	-	-	1	9	53	72	29	4	-	-	-	-	-	-	-	-	-	-	-	3	96	61	-	-
Ps. alticaudex	-	-	-	-	3	44	24	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	64	1	-	-
Ps. andamanensis	-	-	-	-	1	27	39	11	1	-	-	-	-	-	-	-	-	-	-	-	-	-	25	49	-	-	-
Ps. aureolineatus	-	-	-	-	-	-	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3	-	-	-
Ps. aurulentus	-	-	-	-	-	1	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-
Ps. bitaeniatus	-	-	-	-	-	-	4	40	27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	29	34	-	-
Ps. caudalis	-	-	-	-	-	-	-	-	24	15	10	1	-	-	-	-	-	-	-	-	-	-	17	31	1	-	-
Ps. coccinicauda	-	-	-	3	28	23	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	4	50	4	-	-	-
Ps. colei	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
Ps. cometes	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Ps. cyanotaenia	-	27	104	74	32	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	204	7	-	-	-
Ps. dilectus	-	-	-	-	-	-	1	-	10	19	5	1	-	-	-	-	-	-	-	-	-	-	6	26	-	-	-
Ps. dixurus	-	-	-	-	-	-	-	3	11	12	1	-	-	-	-	-	-	-	-	-	-	-	-	4	20	1	-
Ps. dutoiti	-	-	-	-	-	2	12	20	15	1	-	-	-	-	-	-	-	-	-	-	-	-	-	41	1	-	-
Ps. elongatus	-	-	-	7	32	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	32	-	-	-
Ps. flammicauda	-	-	-	-	1	6	26	26	3	-	-	-	-	-	-	-	-	-	-	-	-	-	6	46	1	-	-
Ps. flavivertex	-	-	-	-	-	-	3	21	37	4	1	-	-	-	-	-	-	-	-	-	-	-	-	13	49	1	-
Ps. flavopunctatus	-	-	1	8	4	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	6	-	-	-	-
Ps. fowleri	-	-	-	-	8	40	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	29	18	-	-	-
Ps. fridmani	-	-	-	4	10	19	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	20	2	-	-
Ps. fuscus	-	-	-	-	-	1	22	70	123	110	40	7	2	-	-	-	-	-	-	-	-	-	14	298	49	2	-
Ps. howsoni	-	-	-	-	-	1	7	26	23	3	-	-	-	-	-	-	-	-	-	-	-	1	38	11	-	-	-
Ps. jamesi	-	-	-	-	5	18	33	9	-	-	-	-	-	-	-	-	-	-	-	-	-	2	60	1	-	-	-
Ps. kolythrus	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Ps. kristinae	-	-	-	-	-	1	14	35	20	4	-	-	-	-	-	-	-	-	-	-	-	-	22	46	-	-	-
Ps. leucorhynchus	-	-	-	-	-	3	8	11	12	3	-	-	-	-	-	-	-	-	-	-	-	-	10	22	1	-	-
Ps. linda	-	-	-	-	-	-	-	-	-	-	3	16	29	23	8	8	1	-	-	-	-	-	-	42	39	2	-
Ps. litus	-	-	-	-	-	7	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-	-	-	-
Ps. luteus	-	-	-	1	8	23	13	3	-	-	-	-	-	-	-	-	-	-	-	-	-	2	38	4	-	-	-
Ps. madagascariensis	-	-	-	-	-	-	3	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	4	6	-	-	-
Ps. magnificus	-	-	-	-	-	3	25	20	4	-	-	-	-	-	-	-	-	-	-	-	-	-	27	25	-	-	-
Ps. marshallensis	-	-	-	1	28	131	80	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	112	128	3	-	-
Ps. melanurus	-	-	13	37	26	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	72	-	-	-	-
Ps. melas	-	-	-	-	-	1	6	17	30	6	4	-	-	-	-	-	-	-	-	-	-	-	5	45	2	-	-
Ps. mooii	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-
Ps. moorei	-	-	-	-	-	-	-	8	4	-	-	-	-	-	-	-	-	-	-	-	-	-	10	2	-	-	-
Ps. natalensis	-	-	-	-	-	-	3	30	51	6	-	-	-	-	-	-	-	-	-	-	-	-	39	43	-	-	-
Ps. nigrovittatus	-	-	-	-	-	-	8	12	27	8	-	-	-	-	-	-	-	-	-	-	-	-	-	44	1	-	-
Ps. olivaceus	-	-	-	-	-	-	-	-	-	5	17	28	39	17	2	1	1	-	-	-	-	-	-	38	68	2	-
Ps. omanensis	-	-	-	-	-	-	-	-	6	26	4	2	-	-	-	-	-	-	-	-	-	-	28	-	-	-	-
Ps. persicus	-	-	-	-	-	-	-	-	3	13	36	12	-	-	-	-	-	-	-	-	-	-	2	59	3	-	-
Ps. perspicillatus	-	-	-	-	-	-	-	1	11	18	14	3	1	-	-	-	-	-	-	-	-	-	-	26	20	2	-
Ps. pesi	-	-	-	-	-	-	4	13	16	1	-	-	-	-	-	-	-	-	-	-	-	-	-	21	3	-	-
Ps. pictus	-	-	-	-	-	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1	-	-	-
Ps. punctatus	-	-	-	-	-	3	3	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	5	-	-	-
Ps. pylei	-	-	-	-	1	3	9	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	1	-	-	-
Ps. quinquedentatus	-	-	-	-	-	4	12	39	37	3	1	-	-	-	-	-	-	-	-	-	-	-	75	5	-	-	-
Ps. ransonneti	-	-	-	-	1	20	23	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	19	23	-	-	-
Ps. reticulatus	-	-	-	-	6	10	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	-	-	-	-
Ps. sankeyi	-	-	-	-	-	-	3	25	12	1	-	-	-	-	-	-	-	-	-	-	-	-	-	9	9	-	-
Ps. springeri	-	-	-	-	2	18	10	8	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	33	-	1	-
Ps. steenei	-	-	-	-	-	-	2	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	8	4	-	-	-
Ps. striatus	1	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6	-	-	-	-
Ps. tapeinosoma	-	8	93	61	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	156	1	-	-	-
Ps. tauberae	-	-	-	-	-	-	6	23	28	7	-	-	-	-	-	-	-	-	-	-	-	-	9	47	1	-	-
Ps. viridis	-	-	-	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	6	-	-	-	-
Ps. wilsoni	-	-	-	-	-	-	1	18	71	29	7	-	-	-	-	-	-	-	-	-	-	-	1	108	8	-	-

Appendix Table 1j. Circumpeduncular scales.

	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
Ad. desmonotus	-	-	-	-	1	8	20	13	8	7	1	-	-	-	-	-	-	-	-
As. punctatus	-	-	-	1	1	8	47	5	-	-	-	-	-	-	-	-	-	-	-
C. purpurascens	-	-	69	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. zaps	1	-	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. atrofasciatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
L. cyclophthalmus	-	-	-	-	-	-	-	-	-	-	8	9	22	24	27	4	2	-	-
L. lineatus	-	-	-	-	-	-	-	-	-	-	-	-	3	12	20	4	1	-	-
M. alleni	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. paranox	-	-	-	-	2	4	15	1	-	-	-	-	-	-	-	-	-	-	-
M. polynemus	-	-	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. splendens	-	-	23	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. winterbottomi	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Og. novaehollandiae	-	-	-	-	-	-	-	-	2	2	10	1	-	-	-	-	-	-	-
Og. queenslandiae	-	-	-	-	-	-	-	-	-	-	20	7	4	-	-	-	-	-	-
Og. salvati	-	-	-	-	-	1	22	-	-	-	-	-	-	-	-	-	-	-	-
Ox. veliferus	-	-	-	-	-	-	-	-	1	2	15	-	-	-	-	-	-	-	-
Ph. marginata	-	-	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. aurifrons	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. coralensis	-	-	27	13	12	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. diadema	-	1	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. ephippiata	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. paccagnellae	-	-	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. porphyrea	-	-	43	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. aldabraensis	-	-	-	-	-	1	79	2	-	-	-	-	-	-	-	-	-	-	-
Ps. alticaudex	-	-	1	3	2	-	33	-	-	-	-	-	-	-	-	-	-	-	-
Ps. andamanensis	-	-	41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aureolineatus	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aurulentus	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. bitaeniatus	-	-	-	-	8	15	15	-	-	-	-	-	-	-	-	-	-	-	-
Ps. caudalis	-	-	-	-	-	-	12	10	2	1	-	-	-	-	-	-	-	-	-
Ps. coccinicauda	-	-	29	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. colei	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cometes	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cyanotaenia	-	1	119	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dilectus	-	-	-	-	-	-	14	4	-	-	-	-	-	-	-	-	-	-	-
Ps. dixurus	-	-	-	-	-	-	14	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dutoiti	-	-	-	-	-	1	26	-	-	-	-	-	-	-	-	-	-	-	-
Ps. elongatus	-	-	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flammicauda	-	-	-	1	-	2	30	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavivertex	-	-	-	-	-	1	32	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavopunctatus	-	-	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fowleri	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fridmani	-	-	16	7	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fuscus	-	-	1	1	6	6	164	4	-	1	-	-	-	-	-	-	-	-	-
Ps. howsoni	-	-	-	-	-	-	30	-	-	-	-	-	-	-	-	-	-	-	-
Ps. jamesi	-	-	34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kolythrus	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kristinae	-	-	-	-	2	5	30	-	-	-	-	-	-	-	-	-	-	-	-
Ps. leucorhynchus	-	-	1	1	2	5	10	-	-	-	-	-	-	-	-	-	-	-	-
Ps. linda	-	-	-	-	-	2	34	6	2	-	-	-	-	-	-	-	-	-	-
Ps. litus	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. luteus	-	-	26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. madagascariensis	-	-	-	-	-	-	4	1	-	-	-	-	-	-	-	-	-	-	-
Ps. magnificus	-	-	-	-	-	1	25	-	-	-	-	-	-	-	-	-	-	-	-
Ps. marshallensis	-	1	127	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melanurus	-	-	39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melas	-	-	-	-	-	2	30	-	1	-	-	-	-	-	-	-	-	-	-
Ps. mooii	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. moorei	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-
Ps. natalensis	-	-	-	-	-	4	33	6	2	-	-	-	-	-	-	-	-	-	-
Ps. nigrovittatus	-	-	-	-	-	-	24	3	-	-	-	-	-	-	-	-	-	-	-
Ps. olivaceus	-	-	-	-	-	1	34	10	9	1	-	-	-	-	-	-	-	-	-
Ps. omanensis	-	-	-	-	-	-	11	2	1	-	-	-	-	-	-	-	-	-	-
Ps. persicus	-	-	-	-	-	-	1	7	8	12	3	1	-	-	-	-	-	-	-
Ps. perspicillatus	-	-	-	-	-	-	3	5	5	7	4	-	-	-	-	-	-	-	-
Ps. pesi	-	-	-	-	-	1	16	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pictus	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Ps. punctatus	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pylei	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. quinquedentatus	-	-	-	-	-	1	46	1	-	-	-	-	-	-	-	-	-	-	-
Ps. ransonneti	-	-	-	-	-	1	23	-	-	-	-	-	-	-	-	-	-	-	-
Ps. reticulatus	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. sankeyi	-	-	-	-	-	1	19	-	-	-	-	-	-	-	-	-	-	-	-
Ps. springeri	-	-	-	-	-	-	18	3	-	-	-	-	-	-	-	-	-	-	-
Ps. steenei	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-
Ps. striatus	1	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tapeinosoma	-	-	88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tauberae	-	-	-	-	1	1	29	1	-	-	-	-	-	-	-	-	-	-	-
Ps. viridis	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. wilsoni	-	-	-	-	-	1	60	-	-	1	-	-	-	-	-	-	-	-	-

Appendix Table 1k. Predorsal scales.

	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
Ad. desmonotus	-	-	1	15	12	19	10	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
As. punctatus	-	-	3	12	20	16	8	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. purpurascens	-	-	-	9	16	12	19	11	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C. zaps	-	-	-	4	12	12	13	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L. atrofasciatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
L. cyclophthalmus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	8	3	17	6.	15	10	12	10	4	3	1	-	1	-	-	-
L. lineatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	4	4	3	5	5	4	3	4	3	1	1	-	-	-	-	1
M. alleni	-	-	-	-	-	-	-	1	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. paranox	-	-	-	-	-	-	-	-	1	3	4	1	6	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. polynemus	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	1	1	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. splendens	-	-	-	-	-	-	-	1	2	3	4	5	6	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. winterbottomi	-	-	-	-	-	-	-	-	3	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Og. novaehollandiae	-	-	-	-	-	-	-	-	2	-	3	2	2	1	2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Og. queenslandiae	-	-	-	-	-	-	-	-	-	-	2	3	3	-	1	6	5	4	3	4	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Og. salvati	-	-	-	-	2	2	8	3	5	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ox. veliferus	-	-	-	-	-	-	1	1	1	2	3	4	3	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ph. marginata	-	-	-	-	-	-	1	2	4	3	4	2	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. aurifrons	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. coralensis	-	-	-	-	-	-	-	3	12	13	15	8	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. diadema	-	-	-	-	-	-	-	3	4	3	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. ephippiata	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. paccagnellae	-	-	-	-	-	2	10	24	15	13	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. porphyrea	-	-	-	-	-	3	9	9	15	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aldabraensis	-	-	-	-	-	-	-	2	1	2	13	13	17	17	10	5	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. alticaudex	-	-	-	-	-	-	-	-	1	6	3	11	9	5	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. andamanensis	-	-	-	-	-	2	4	7	9	5	4	1	6	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aureolineatus	-	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aurulentus	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. bitaeniatus	-	-	-	-	-	-	-	-	1	1	3	8	11	10	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. caudalis	-	-	-	-	-	-	-	-	1	1	4	2	6	5	6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. coccinicauda	-	-	2	4	8	11	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. colei	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cometes	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cyanotaenia	-	1	12	39	37	23	16	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dilectus	-	-	-	-	-	-	-	-	1	-	-	1	5	1	7	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dixurus	-	-	-	-	-	-	-	-	-	-	2	3	1	3	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dutoiti	-	-	-	-	-	-	-	-	-	-	2	4	4	5	4	3	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. elongatus	-	-	-	1	1	3	2	4	4	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flammicauda	-	-	-	-	-	3	2	4	8	7	8	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavivertex	-	-	-	-	-	-	2	2	6	11	9	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavopunctatus	-	-	-	-	-	-	1	-	-	-	2	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fowleri	-	-	-	1	5	4	10	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fridmani	-	-	-	-	-	-	-	-	1	-	1	5	5	7	2	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fuscus	-	-	-	-	-	-	-	-	-	-	-	1	3	5	12	25	39	27	23	17	13	13	6	6	-	1	1	-	-	-	-	-	-	-	-	-
Ps. howsoni	-	-	-	-	-	-	-	1	2	5	7	11	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. jamesi	-	-	-	-	-	8	5	7	9	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kolythrus	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kristinae	-	-	-	-	-	-	-	3	9	8	10	1	1	3	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. leucorhynchus	-	-	-	-	-	-	-	-	2	3	7	6	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. linda	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	3	4	6	7	7	3	7	2	-	1	-	-	-	-	-	-	-	-
Ps. litus	-	-	-	-	-	-	-	-	-	-	-	1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. luteus	-	-	3	6	8	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. madagascariensis	-	-	-	-	-	-	-	-	-	-	-	2	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. magnificus	-	-	2	4	7	6	5	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. marshallensis	-	-	-	-	-	-	2	2	14	24	32	24	13	7	3	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melanurus	-	-	5	13	14	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melas	-	-	-	-	-	-	-	-	5	5	14	4	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. mooii	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. moorei	-	-	-	-	-	-	-	-	1	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. natalensis	-	-	-	-	-	-	2	10	11	13	8	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. nigrovittatus	-	-	1	1	-	2	2	2	1	3	2	6	1	2	-	1	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. olivaceus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	3	9	12	9	7	5	3	1	1	-	1	-	-	-	-	-
Ps. omanensis	-	-	-	-	-	-	-	-	-	-	-	-	1	1	3	2	3	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. persicus	-	-	-	-	-	-	-	-	-	-	-	2	1	2	3	11	2	7	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. perspicillatus	-	-	-	-	-	-	-	-	-	-	-	-	3	6	3	6	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pesi	-	-	-	-	-	-	-	2	8	3	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pictus	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. punctatus	-	-	-	-	-	-	1	2	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pylei	-	-	-	-	-	-	-	-	-	-	1	3	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. quinquedentatus	-	-	-	-	-	4	7	17	13	3	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. ransonneti	-	-	-	-	2	4	11	5	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. reticulatus	-	-	-	-	-	-	2	1	6	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. sankeyi	-	-	-	-	-	-	-	3	2	3	5	4	3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. springeri	-	-	-	-	-	-	-	-	-	-	-	1	2	4	5	4	2	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. steenei	-	-	-	-	-	-	-	1	-	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. striatus	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tapeinosoma	4	33	22	17	9	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tauberae	-	-	-	-	-	-	4	11	7	4	4	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. viridis	-	-	-	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. wilsoni	-	-	-	-	-	-	-	5	7	2	13	20	10	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix Table 1l. Predorsal scale termination positions. Numbers correspond to the following positions (see Figure 1): 1 - posterior to PIO pores; 2 - PIO pores; 3 - posterior AIO pores; 4 - mid AIO pores; 5 - anterior AIO pores; 6 - midway between anterior AIO and posterior nasal pores; 7 - posterior nasal pores; 8 - midway between posterior nasal pores and posterior nostrils; 9 - posterior nostrils; 10 - midway between nostrils; 11 - anterior nostrils; 12 - anterior nasal pores.

	1	2	3	4	5	6	7	8	9	10	11	12
Ad. desmonotus	-	-	13	40	6	-	-	-	-	-	-	-
As. punctatus	-	-	2	43	15	3	-	-	-	-	-	-
C. purpurascens	-	-	-	22	44	2	-	-	-	-	-	-
C. zaps	-	-	-	1	19	19	7	-	-	-	-	-
L. atrofasciatus	-	-	-	1	-	-	-	-	-	-	-	-
L. cyclophthalmus	-	-	1	83	7	-	-	-	-	-	-	-
L. lineatus	-	-	-	22	2	-	-	-	-	-	-	-
M. alleni	-	-	-	-	2	1	1	-	-	-	-	-
M. paranox	-	-	2	-	7	8	4	-	1	-	-	-
M. polynemus	-	-	1	-	-	-	-	-	-	1	2	3
M. splendens	-	-	-	4	19	1	-	-	-	-	-	-
M. winterbottomi	-	-	-	-	1	1	3	-	-	-	-	-
Og. novaehollandiae	-	-	-	7	10	-	-	-	-	-	-	-
Og. queenslandiae	-	-	-	5	23	4	-	-	-	-	-	-
Og. salvati	-	-	-	23	-	-	-	-	-	-	-	-
Ox. veliferus	-	-	3	13	2	-	-	-	-	-	-	-
Ph. marginata	-	-	-	-	-	-	-	-	6	9	2	-
Pi. aurifrons	-	-	-	-	-	-	1	-	-	-	-	-
Pi. coralensis	-	-	-	-	1	5	25	5	18	-	-	-
Pi. diadema	-	-	-	-	-	5	13	-	-	-	-	-
Pi. ephippiata	-	-	-	-	-	-	2	-	-	-	-	-
Pi. paccagnellae	-	-	-	-	12	31	28	-	-	-	-	-
Pi. porphyrea	-	-	-	-	17	14	13	-	-	-	-	-
Ps. aldabraensis	-	5	34	40	4	-	-	-	-	-	-	-
Ps. alticaudex	-	-	-	-	2	10	25	2	-	-	-	-
Ps. andamanensis	-	-	-	14	24	2	1	-	-	-	-	-
Ps. aureolineatus	-	-	-	2	1	-	-	-	-	-	-	-
Ps. aurulentus	-	-	-	-	1	-	1	-	1	-	-	-
Ps. bitaeniatus	-	-	10	18	11	-	-	-	-	-	-	-
Ps. caudalis	-	-	-	21	15	-	-	-	-	-	-	-
Ps. coccinicauda	-	-	-	10	20	-	-	-	-	-	-	-
Ps. colei	-	-	-	-	1	-	-	-	-	-	-	-
Ps. cometes	-	1	-	-	-	-	-	-	-	-	-	-
Ps. cyanotaenia	-	-	1	21	97	14	1	-	-	-	-	-
Ps. dilectus	-	-	1	-	-	2	14	1	-	-	-	-
Ps. dixurus	-	-	2	5	6	-	-	-	-	-	-	-
Ps. dutoiti	-	-	7	18	2	-	-	-	-	-	-	-
Ps. elongatus	-	-	-	-	15	6	1	-	-	-	-	-
Ps. flammicauda	-	-	-	-	1	4	9	10	9	-	-	-
Ps. flavivertex	-	-	3	16	15	-	-	-	-	-	-	-
Ps. flavopunctatus	-	-	-	-	1	-	1	1	5	-	-	-
Ps. fowleri	-	-	-	-	20	2	3	1	-	-	-	-
Ps. fridmani	-	-	-	-	1	2	11	7	4	-	-	-
Ps. fuscus	-	-	2	1	11	21	56	44	35	-	1	-
Ps. howsoni	-	-	1	29	-	-	-	-	-	-	-	-
Ps. jamesi	-	-	-	14	18	1	-	-	-	-	-	-
Ps. kolythrus	-	-	-	-	1	-	-	-	-	-	-	-
Ps. kristinae	-	-	-	7	17	9	6	-	-	-	-	-
Ps. leucorhynchus	-	-	-	7	10	2	-	-	-	-	-	-
Ps. linda	-	1	8	13	17	2	1	-	-	-	-	-
Ps. litus	-	-	-	-	-	-	3	-	3	-	-	-
Ps. luteus	-	-	1	4	14	5	2	-	-	-	-	-
Ps. madagascariensis	-	-	-	4	1	-	-	-	-	-	-	-
Ps. magnificus	-	-	1	21	4	-	-	-	-	-	-	-
Ps. marshallensis	-	-	-	8	83	32	4	-	-	-	-	-
Ps. melanurus	-	-	-	12	26	1	-	-	-	-	-	-
Ps. melas	-	-	3	25	5	-	-	-	-	-	-	-
Ps. mooii	-	-	-	1	-	-	-	-	-	-	-	-
Ps. moorei	-	-	-	6	-	-	-	-	-	-	-	-
Ps. natalensis	-	-	11	34	-	-	-	-	-	-	-	-
Ps. nigrovittatus	7	5	10	5	-	-	-	-	-	-	-	-
Ps. olivaceus	-	-	1	4	29	20	7	-	-	-	-	-
Ps. omanensis	-	-	-	10	4	-	-	-	-	-	-	-
Ps. persicus	-	2	11	17	3	-	-	-	-	-	-	-
Ps. perspicillatus	-	-	2	1	19	3	-	-	-	-	-	-
Ps. pesi	-	-	1	11	5	1	-	-	-	-	-	-
Ps. pictus	-	-	-	-	-	-	2	-	-	-	-	-
Ps. punctatus	-	-	1	3	1	-	-	-	-	-	-	-
Ps. pylei	-	-	-	-	-	1	5	-	1	-	-	-
Ps. quinquedentatus	-	-	8	40	-	-	-	-	-	-	-	-
Ps. ransonneti	-	1	2	15	6	-	-	-	-	-	-	-
Ps. reticulatus	-	-	-	-	2	6	2	-	-	-	-	-
Ps. sankeyi	-	-	3	4	11	3	-	-	-	-	-	-
Ps. springeri	-	-	-	2	16	3	-	-	-	-	-	-
Ps. steenei	-	-	-	6	-	-	-	-	-	-	-	-
Ps. striatus	-	-	-	-	3	-	-	-	-	-	-	-
Ps. tapeinosoma	-	-	1	27	54	3	3	-	-	-	-	-
Ps. tauberae	-	-	-	7	22	2	2	-	-	-	-	-
Ps. viridis	-	-	-	1	2	1	-	-	-	-	-	-
Ps. wilsoni	-	-	-	-	10	16	33	2	1	-	-	-

Appendix Table 1m. Cheek scales (including bilateral counts for *Pictichromis aurifrons*).

	Scales behind eye					Scales to preopercular angle									
	1	2	3	4	5	3	4	5	6	7	8	9	10	11	12
Ad. desmonotus	58	-	-	-	-	2	45	10	1	-	-	-	-	-	-
As. punctatus	1	44	17	1	-	-	16	41	6	-	-	-	-	-	-
C. purpurascens	-	8	50	7	-	3	51	13	1	-	-	-	-	-	-
C. zaps	-	23	19	1	-	31	15	-	-	-	-	-	-	-	-
L. atrofasciatus	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-
L. cyclophthalmus	-	6	67	24	-	-	-	1	17	50	28	-	1	-	-
L. lineatus	-	-	17	18	3	-	-	-	2	4	14	14	5	1	1
M. alleni	-	1	2	-	-	-	3	1	-	-	-	-	-	-	-
M. paranox	-	1	11	6	-	-	6	6	7	3	-	-	-	-	-
M. polynemus	-	1	1	4	-	-	-	2	2	1	-	-	-	-	-
M. splendens	-	-	17	5	-	-	-	12	9	3	-	-	-	-	-
M. winterbottomi	-	-	2	3	-	-	-	2	2	1	-	-	-	-	-
Og. novaehollandiae	-	5	7	2	-	-	-	1	7	8	-	-	-	-	-
Og. queenslandiae	-	6	21	6	-	-	-	2	22	13	1	-	-	-	-
Og. salvati	-	22	-	-	-	-	14	8	1	-	-	-	-	-	-
Ox. veliferus	-	1	13	4	-	-	-	1	10	7	-	-	-	-	-
Ph. marginata	-	1	13	-	-	-	7	10	-	-	-	-	-	-	-
Pi. aurifrons	-	1	1	-	-	-	2	-	-	-	-	-	-	-	-
Pi. coralensis	-	7	44	-	-	2	36	16	-	-	-	-	-	-	-
Pi. diadema	1	2	6	-	-	2	10	4	-	-	-	-	-	-	-
Pi. ephippiata	-	-	1	1	-	-	-	1	1	-	-	-	-	-	-
Pi. paccagnellae	-	7	55	-	1	1	24	40	4	-	-	-	-	-	-
Pi. porphyrea	-	9	25	-	-	-	26	12	4	-	-	-	-	-	-
Ps. aldabraensis	-	-	19	55	10	-	-	38	42	4	-	-	-	-	-
Ps. alticaudex	-	7	23	2	-	-	37	1	-	-	-	-	-	-	-
Ps. andamanensis	-	3	33	4	-	-	37	4	-	-	-	-	-	-	-
Ps. aureolineatus	-	-	2	1	-	-	2	-	1	-	-	-	-	-	-
Ps. aurulentus	-	1	2	-	-	-	-	3	-	-	-	-	-	-	-
Ps. bitaeniatus	-	6	21	6	-	-	15	18	2	1	-	-	-	-	-
Ps. caudalis	-	-	19	6	-	-	7	6	13	-	-	-	-	-	-
Ps. coccinicauda	-	9	21	-	-	13	17	-	-	-	-	-	-	-	-
Ps. colei	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-
Ps. cometes	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-
Ps. cyanotaenia	-	25	88	-	-	100	17	-	1	-	-	-	-	-	-
Ps. dilectus	-	1	13	2	-	-	-	14	3	-	-	-	-	-	-
Ps. dixurus	-	-	3	7	3	-	-	2	8	4	-	-	-	-	-
Ps. dutoiti	-	-	8	14	4	-	-	15	12	-	-	-	-	-	-
Ps. elongatus	1	8	11	-	-	4	18	1	-	-	-	-	-	-	-
Ps. flammicauda	-	12	9	-	-	12	17	1	-	-	-	-	-	-	-
Ps. flavivertex	1	12	18	1	-	-	13	19	1	-	-	-	-	-	-
Ps. flavopunctatus	-	1	6	1	-	-	5	2	1	-	-	-	-	-	-
Ps. fowleri	-	3	20	1	-	1	25	-	-	-	-	-	-	-	-
Ps. fridmani	-	1	12	3	-	-	17	6	-	-	-	-	-	-	-
Ps. fuscus	-	5	143	37	2	1	79	87	25	-	-	-	-	-	-
Ps. howsoni	-	-	13	17	-	-	-	-	11	12	6	1	-	-	-
Ps. jamesi	-	9	21	-	-	4	26	4	-	-	-	-	-	-	-
Ps. kolythrus	-	1	-	-	-	1	-	-	-	-	-	-	-	-	-
Ps. kristinae	-	6	28	1	-	2	20	10	4	1	-	-	-	-	-
Ps. leucorhynchus	-	1	16	2	-	-	9	9	1	-	-	-	-	-	-
Ps. linda	-	-	13	26	4	-	-	-	10	22	12	-	-	-	-
Ps. litus	-	1	3	2	-	-	1	5	-	-	-	-	-	-	-
Ps. luteus	-	9	13	-	-	8	13	3	-	-	-	-	-	-	-
Ps. madagascariensis	-	-	5	-	-	-	1	3	1	-	-	-	-	-	-
Ps. magnificus	-	8	15	1	-	-	18	6	-	-	-	-	-	-	-
Ps. marshallensis	-	7	109	11	-	2	111	15	-	-	-	-	-	-	-
Ps. melanurus	-	11	26	1	-	34	3	-	-	-	-	-	-	-	-
Ps. melas	-	1	11	19	2	-	3	13	16	1	-	-	-	-	-
Ps. mooii	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-
Ps. moorei	-	-	3	3	-	-	-	-	-	1	4	1	-	-	-
Ps. natalensis	-	2	39	4	-	-	16	24	4	1	-	-	-	-	-
Ps. nigrovittatus	-	-	7	20	-	-	-	7	18	3	-	-	-	-	-
Ps. olivaceus	-	-	9	39	7	-	-	-	16	30	8	1	-	-	-
Ps. omanensis	-	-	6	8	-	-	-	1	4	5	4	-	-	-	-
Ps. persicus	-	-	9	18	5	-	-	3	5	20	5	-	-	-	-
Ps. perspicillatus	-	2	16	5	-	-	-	3	17	4	-	-	-	-	-
Ps. pesi	-	1	10	3	-	-	3	10	2	1	-	-	-	-	-
Ps. pictus	-	-	1	1	-	-	-	2	-	-	-	-	-	-	-
Ps. punctatus	-	-	2	3	-	-	1	3	1	-	-	-	-	-	-
Ps. pylei	-	2	5	-	-	1	6	-	-	-	-	-	-	-	-
Ps. quinquedentatus	-	3	30	15	-	-	-	-	4	25	17	2	-	-	-
Ps. ransonneti	-	4	14	4	-	-	11	13	-	-	-	-	-	-	-
Ps. reticulatus	-	4	5	1	-	-	1	6	1	-	-	-	-	-	-
Ps. sankeyi	-	-	16	3	-	-	4	14	1	-	-	-	-	-	-
Ps. springeri	-	-	3	18	-	-	4	13	4	-	-	-	-	-	-
Ps. steenei	-	-	4	2	-	-	-	-	2	3	1	-	-	-	-
Ps. striatus	-	3	-	-	-	3	-	-	-	-	-	-	-	-	-
Ps. tapeinosoma	-	34	43	-	-	80	2	-	-	-	-	-	-	-	-
Ps. tauberae	-	4	22	2	-	1	32	-	-	-	-	-	-	-	-
Ps. viridis	-	4	-	-	-	3	1	-	-	-	-	-	-	-	-
Ps. wilsoni	-	2	47	7	-	-	11	42	7	-	-	-	-	-	-

Appendix Table 1n. Gill rakers (including bilateral counts for *Labracinus atrofasciatus*, *Pictichromis aurifrons* and *Pseudochromis colei*).

	Upper								Lower									Total															
	3	4	5	6	7	8	9	10	9	10	11	12	13	14	15	16	17	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Ad. desmonotus	-	30	22	5	1	-	-	-	1	16	26	13	1	-	-	-	-	-	-	7	21	15	11	2	-	-	-	-	-	-	-	-
As. punctatus	1	19	30	12	1	-	-	-	22	37	5	-	-	-	-	-	-	1	9	18	25	8	3	-	-	-	-	-	-	-	-	-
C. purpurascens	-	28	39	2	1	-	-	-	-	2	54	12	2	-	-	-	-	-	-	1	18	44	5	1	1	-	-	-	-	-	-	-
C. zaps	2	30	14	-	-	-	-	-	1	18	26	-	-	-	-	-	-	-	1	19	21	13	-	-	-	-	-	-	-	-	-	-
L. atrofasciatus	-	-	-	1	1	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
L. cyclophthalmus	-	-	-	16	38	31	10	1	-	-	9	47	33	6	1	-	-	-	-	-	-	-	1	10	34	23	18	6	3	-	-	-
L. lineatus	-	-	5	25	10	1	-	-	-	-	12	24	5	-	-	-	-	-	-	-	-	2	10	18	8	3	-	-	-	-	-	-
M. alleni	-	1	1	2	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	1	2	1	-	-	-	-	-	-	-	-
M. paranox	-	4	16	5	-	-	-	-	-	-	5	16	1	-	-	-	-	-	-	-	-	4	15	2	1	-	-	-	-	-	-	-
M. polynemus	-	2	5	-	-	-	-	-	-	-	-	1	6	-	-	-	-	-	-	-	-	-	1	6	-	-	-	-	-	-	-	-
M. splendens	-	-	11	9	4	-	-	-	-	-	-	20	4	-	-	-	-	-	-	-	-	-	8	11	5	-	-	-	-	-	-	-
M. winterbottomi	-	-	1	4	-	-	-	-	-	-	1	2	2	-	-	-	-	-	-	-	-	-	3	-	2	-	-	-	-	-	-	-
Og. novaehollandiae	-	-	5	9	1	1	-	-	-	1	13	2	-	-	-	-	-	-	-	-	-	6	7	2	-	-	-	-	-	-	-	-
Og. queenslandiae	-	-	2	15	11	4	-	-	-	-	5	24	3	-	-	-	-	-	-	-	-	1	3	12	12	4	-	-	-	-	-	-
Og. salvati	-	5	15	2	1	-	-	-	-	1	17	5	-	-	-	-	-	-	-	-	5	13	3	1	1	-	-	-	-	-	-	-
Ox. veliferus	-	-	10	4	4	-	-	-	-	1	14	3	-	-	-	-	-	-	-	-	1	9	3	3	2	-	-	-	-	-	-	-
Ph. marginata	-	4	12	1	-	-	-	-	-	10	7	-	-	-	-	-	-	-	-	2	10	4	1	-	-	-	-	-	-	-	-	-
Pi. aurifrons	-	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-
Pi. coralensis	-	-	3	30	18	-	-	-	-	-	-	-	-	6	36	10	-	-	-	-	-	-	-	-	8	25	17	4	-	-	-
Pi. diadema	-	-	2	11	5	-	-	-	-	-	-	-	3	13	2	-	-	-	-	-	-	-	1	3	7	7	-	-	-	-	-
Pi. ephippiata	-	-	-	1	1	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-
Pi. paccagnellae	-	-	3	40	24	4	-	-	-	-	-	-	-	25	35	9	2	-	-	-	-	-	-	-	1	23	17	18	8	2	-	-
Pi. porphyrea	-	-	7	26	9	2	-	-	-	-	-	-	3	19	22	-	-	-	-	-	-	-	1	5	15	16	5	2	-	-	-
Ps. aldabraensis	1	18	58	8	-	-	-	-	-	-	27	56	2	-	-	-	-	-	-	-	6	32	40	7	-	-	-	-	-	-	-	-
Ps. alticaudex	1	20	15	3	-	-	-	-	2	24	11	2	-	-	-	-	-	-	2	16	10	9	1	1	-	-	-	-	-	-	-	-
Ps. andamanensis	-	15	20	5	-	-	-	-	-	1	36	3	-	-	-	-	-	-	-	1	12	22	4	1	-	-	-	-	-	-	-	-
Ps. aureolineatus	-	-	1	1	1	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	1	-	1	1	-	-	-	-	-	-
Ps. aurulentus	-	-	-	1	2	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	1	-	2	-	-	-	-	-	-	-
Ps. bitaeniatus	4	18	15	2	-	-	-	-	-	-	1	31	7	-	-	-	-	-	-	-	3	16	16	4	-	-	-	-	-	-	-	-
Ps. caudalis	-	10	12	4	-	-	-	-	-	1	17	7	1	-	-	-	-	-	-	-	8	10	6	2	-	-	-	-	-	-	-	-
Ps. coccinicauda	5	19	5	1	-	-	-	-	-	17	13	-	-	-	-	-	-	-	1	16	10	3	-	-	-	-	-	-	-	-	-	-
Ps. colei	-	-	-	1	1	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Ps. cometes	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Ps. cyanotaenia	43	57	17	-	-	-	-	-	3	51	64	1	-	-	-	-	-	-	21	50	35	11	-	-	-	-	-	-	-	-	-	-
Ps. dilectus	-	2	11	4	1	-	-	-	-	-	11	7	-	-	-	-	-	-	-	-	1	9	5	2	1	-	-	-	-	-	-	-
Ps. dixurus	-	-	-	-	6	5	3	-	-	-	-	-	-	-	-	6	8	-	-	-	-	-	-	-	-	-	-	-	4	3	5	2
Ps. dutoiti	-	8	12	7	-	-	-	-	-	-	19	7	1	-	-	-	-	-	-	-	7	8	9	3	-	-	-	-	-	-	-	-
Ps. elongatus	-	9	13	1	-	-	-	-	-	4	17	1	1	-	-	-	-	-	-	3	7	10	2	1	-	-	-	-	-	-	-	-
Ps. flammicauda	-	13	17	3	-	-	-	-	-	2	28	3	-	-	-	-	-	-	-	1	12	14	5	1	-	-	-	-	-	-	-	-
Ps. flavivertex	-	-	1	23	10	-	-	-	-	-	1	1	9	18	5	-	-	-	-	-	-	-	1	-	9	13	10	1	-	-	-	-
Ps. flavopunctatus	-	-	2	2	4	-	-	-	-	-	5	2	1	-	-	-	-	-	-	-	-	2	1	2	2	1	-	-	-	-	-	-
Ps. fowleri	-	4	13	8	1	-	-	-	-	-	13	12	1	-	-	-	-	-	-	-	2	8	12	2	2	-	-	-	-	-	-	-
Ps. fridmani	-	-	-	3	15	7	-	-	-	-	-	-	-	-	5	11	9	-	-	-	-	-	-	-	-	-	1	5	7	9	3	-
Ps. fuscus	-	-	29	86	66	9	1	-	-	-	6	91	71	21	2	-	-	-	-	-	-	3	19	51	62	38	19	-	-	-	-	-
Ps. howsoni	-	-	20	10	-	-	-	-	-	1	11	16	1	-	-	-	-	-	-	-	-	11	11	8	-	-	-	-	-	-	-	-
Ps. jamesi	2	18	12	2	-	-	-	-	-	4	23	7	-	-	-	-	-	-	1	4	10	15	4	-	-	-	-	-	-	-	-	-
Ps. kolythrus	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kristinae	-	5	23	7	1	-	-	-	-	-	24	11	1	-	-	-	-	-	-	-	3	15	16	2	-	-	-	-	-	-	-	-
Ps. leucorhynchus	-	5	9	4	1	-	-	-	-	1	16	2	-	-	-	-	-	-	-	1	4	7	6	1	-	-	-	-	-	-	-	-
Ps. linda	-	1	18	20	5	-	-	-	-	-	14	25	3	2	-	-	-	-	-	-	1	4	21	11	4	3	-	-	-	-	-	-
Ps. litus	-	-	3	1	2	-	-	-	-	-	2	3	1	-	-	-	-	-	-	-	-	2	-	2	2	-	-	-	-	-	-	-
Ps. luteus	-	11	12	3	-	-	-	-	-	10	11	5	-	-	-	-	-	-	-	6	8	6	5	1	-	-	-	-	-	-	-	-
Ps. madagascariensis	-	-	4	1	-	-	-	-	-	-	3	3	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-	-	-	-
Ps. magnificus	-	5	16	4	1	-	-	-	-	-	-	14	12	-	-	-	-	-	-	-	-	4	10	8	3	1	-	-	-	-	-	-
Ps. marshallensis	-	42	67	18	1	-	-	-	-	-	80	41	4	2	1	-	-	-	-	-	25	60	30	10	2	-	-	1	-	-	-	-
Ps. melanurus	5	29	5	-	-	-	-	-	-	14	28	2	-	-	-	-	-	-	1	12	20	5	1	-	-	-	-	-	-	-	-	-
Ps. melas	-	-	14	18	1	-	-	-	-	-	1	8	21	3	-	-	-	-	-	-	-	1	7	5	18	2	-	-	-	-	-	-
Ps. mooii	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
Ps. moorei	-	-	3	3	-	-	-	-	-	-	-	5	1	-	-	-	-	-	-	-	-	-	2	4	-	-	-	-	-	-	-	-
Ps. natalensis	2	30	12	1	-	-	-	-	-	2	41	2	-	-	-	-	-	-	1	1	28	15	-	-	-	-	-	-	-	-	-	-
Ps. nigrovittatus	-	18	10	-	-	-	-	-	-	12	16	-	-	-	-	-	-	-	-	7	16	5	-	-	-	-	-	-	-	-	-	-
Ps. olivaceus	-	1	14	28	11	1	-	-	-	-	5	41	9	-	-	-	-	-	-	-	1	-	16	23	11	3	1	-	-	-	-	-
Ps. omanensis	-	7	7	-	-	-	-	-	-	4	10	-	-	-	-	-	-	-	-	3	5	6	-	-	-	-	-	-	-	-	-	-
Ps. persicus	-	1	21	10	1	-	-	-	-	1	14	17	1	-	-	-	-	-	-	-	2	9	14	7	1	-	-	-	-	-	-	-
Ps. perspicillatus	-	-	-	4	12	7	-	1	-	-	-	1	19	4	-	-	-	-	-	-	-	-	-	-	4	12	4	3	1	-	-	-
Ps. pesi	-	-	8	10	-	-	-	-	-	-	-	6	12	-	-	-	-	-	-	-	-	-	4	6	8	-	-	-	-	-	-	-
Ps. pictus	-	-	1	1	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-
Ps. punctatus	-	1	4	-	-	-	-	-	-	-	1	4	-	-	-	-	-	-	-	-	-	2	3	-	-	-	-	-	-	-	-	-
Ps. pylei	-	-	3	4	-	-	-	-	-	-	-	2	3	2	-	-	-	-	-	-	-	-	1	1	5	-	-	-	-	-	-	-
Ps. quinquedentatus	-	2	22	21	3	-	-	-	-	3	40	5	-	-	-	-	-	-	-	-	4	18	21	5	-	-	-	-	-	-	-	-
Ps. ransonneti	3	8	11	2	-	-	-	-	-	3	20	1	-	-	-	-	-	-	1	3	7	11	2	-	-	-	-	-	-	-	-	-
Ps. reticulatus	-	-	4	7	1	-	-	-	-	-	-	8	4	-	-	-	-	-	-	-	-	-	3	5	4	-	-	-	-	-	-	-
Ps. sankeyi	-	-	-	7	13	1	-	-	-	-	-	-	-	-	12	9	-	-	-	-	-	-	-	-	-	5	9	6	1	-	-	-
Ps. springeri	-	2	12	7	-	-	-	-	-	-	-	2	15	4	-	-	-	-	-	-	-	-	4	8	7	2	-	-	-	-	-	-
Ps. steenei	-	-	1	4	-	1	-	-	-	-	1	5	-	-	-	-	-	-	-	-	-	-	2	3	-	1	-	-	-	-	-	-
Ps. striatus	1	3	-	-	-	-	-	-	1	2	1	-	-	-	-	-	-	-	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tapeinosoma	7	59	23	-	-	-	-	-	-	53	36	-	-	-	-	-	-	-	5	38	35	11	-	-	-	-	-	-	-	-	-	-
Ps. tauberae	-	1	25	7	-	-	-	-	-	-	7	24	2	-	-	-	-	-	-	-	1	5	19	8	-	-	-	-	-	-	-	-
Ps. viridis	-	4	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-
Ps. wilsoni	1	30	27	3	1	-	-	-	-	-	31	25	5	1	-	-	-	-	-	1	17	23	16	3	-	2	-	-	-	-	-	-

Appendix Table 1o. Pseudobranch filaments (including bilateral counts for *Labracinus atrofasciatus*, *Pictichromis aurifrons* and *Pseudochromis colei*).

	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Ad. desmonotus	-	-	8	19	28	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
As. punctatus	-	-	-	3	16	21	16	6	-	-	-	-	-	-	-	-	-	-	-	-
C. purpurascens	-	-	-	5	17	27	15	5	1	-	-	-	-	-	-	-	-	-	-	-
C. zaps	-	-	1	3	12	27	11	3	-	1	-	-	-	-	-	-	-	-	-	-
L. atrofasciatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
L. cyclophthalmus	-	-	-	-	-	-	-	-	1	8	6	24	16	19	13	10	-	-	-	-
L. lineatus	-	-	-	-	-	-	-	2	7	3	1	8	13	4	2	1	-	-	-	-
M. alleni	-	-	-	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
M. paranox	-	-	1	4	6	4	7	-	-	-	-	-	-	-	-	-	-	-	-	-
M. polynemus	1	-	-	-	-	1	-	4	-	1	-	-	-	-	-	-	-	-	-	-
M. splendens	-	-	-	-	5	9	2	8	-	-	-	-	-	-	-	-	-	-	-	-
M. winterbottomi	-	-	-	-	-	4	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Og. novaehollandiae	-	-	-	-	1	4	7	3	2	-	-	-	-	-	-	-	-	-	-	-
Og. queenslandiae	-	-	-	-	1	2	1	6	6	11	1	3	-	1	-	-	-	-	-	-
Og. salvati	-	-	-	1	7	14	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ox. veliferus	-	-	-	-	1	6	6	7	-	-	-	-	-	-	-	-	-	-	-	-
Ph. marginata	-	-	2	3	11	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. aurifrons	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. coralensis	-	-	-	1	7	20	20	5	-	-	-	-	-	-	-	-	-	-	-	-
Pi. diadema	-	-	-	-	1	6	8	3	-	-	-	-	-	-	-	-	-	-	-	-
Pi. ephippiata	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. paccagnellae	-	-	-	2	17	32	14	6	-	-	-	-	-	-	-	-	-	-	-	-
Pi. porphyrea	-	-	-	1	11	16	14	2	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aldabraensis	-	-	5	13	39	18	10	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. alticaudex	-	1	13	21	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. andamanensis	-	-	3	10	15	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aureolineatus	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aurulentus	-	-	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-
Ps. bitaeniatus	-	-	2	5	18	12	1	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. caudalis	-	-	-	1	1	8	10	3	3	-	-	-	-	-	-	-	-	-	-	-
Ps. coccinicauda	-	-	4	14	9	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. colei	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cometes	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cyanotaenia	-	-	34	64	17	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dilectus	-	-	-	-	8	7	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dixurus	-	-	-	-	-	3	-	3	4	2	2	-	-	-	-	-	-	-	-	-
Ps. dutoiti	-	-	2	2	14	8	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. elongatus	-	1	16	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flammicauda	-	1	20	11	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavivertex	-	-	1	2	13	5	11	2	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavopunctatus	-	-	-	1	-	1	4	1	1	-	-	-	-	-	-	-	-	-	-	-
Ps. fowleri	-	-	2	1	17	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fridmani	-	-	10	7	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fuscus	-	-	-	4	9	34	55	53	29	5	2	-	-	-	-	-	-	-	-	-
Ps. howsoni	-	-	-	-	-	6	8	5	7	4	-	-	-	-	-	-	-	-	-	-
Ps. jamesi	-	1	9	22	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kolythrus	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kristinae	-	-	2	8	11	8	5	3	-	-	-	-	-	-	-	-	-	-	-	-
Ps. leucorhynchus	-	-	-	5	4	6	4	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. linda	-	-	-	1	10	2	9	10	9	2	-	1	-	-	-	-	-	-	-	-
Ps. litus	-	-	-	-	-	-	3	-	2	-	1	-	-	-	-	-	-	-	-	-
Ps. luteus	-	-	12	11	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. madagascariensis	-	-	-	-	-	1	3	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. magnificus	-	-	1	4	11	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. marshallensis	-	-	18	49	42	15	3	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melanurus	-	-	14	18	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melas	-	-	-	-	1	3	4	11	6	5	2	-	-	-	-	-	-	-	-	-
Ps. mooii	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. moorei	-	-	-	-	-	-	-	-	3	-	2	1	-	-	-	-	-	-	-	-
Ps. natalensis	-	-	-	-	3	24	14	2	2	-	-	-	-	-	-	-	-	-	-	-
Ps. nigrovittatus	-	-	1	1	12	12	-	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. olivaceus	-	-	2	3	14	19	9	7	-	1	-	-	-	-	-	-	-	-	-	-
Ps. omanensis	-	-	-	-	-	1	2	7	3	-	1	-	-	-	-	-	-	-	-	-
Ps. persicus	-	-	-	-	1	7	5	9	7	3	-	1	-	-	-	-	-	-	-	-
Ps. perspicillatus	-	-	-	-	4	5	7	6	1	1	-	-	-	-	-	-	-	-	-	-
Ps. pesi	-	-	-	-	3	4	10	1	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pictus	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Ps. punctatus	-	-	-	-	-	1	-	2	2	-	-	-	-	-	-	-	-	-	-	-
Ps. pylei	-	-	-	-	-	4	1	2	-	-	-	-	-	-	-	-	-	-	-	-
Ps. quinquedentatus	-	-	-	-	-	-	10	22	8	5	2	-	-	-	-	-	-	-	-	-
Ps. ransonneti	-	-	2	4	11	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. reticulatus	-	-	-	1	6	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. sankeyi	-	-	2	4	9	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. springeri	-	-	6	9	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. steenei	-	-	-	-	-	-	-	-	1	1	-	3	1	-	-	-	-	-	-	-
Ps. striatus	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tapeinosoma	-	-	36	43	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tauberae	-	-	-	2	11	15	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. viridis	-	-	1	2	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. wilsoni	-	-	1	7	29	23	3	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix Table 1p. Consecutive dorsal-fin pterygiophores inserting in 1:1 ratio with interneural spaces immediately behind neural spine 4. N/A (not applicable) indicates where more than three pterygiophores insert anterior to neural spine 4. Counts for rare specimens with the third pterygiophore displaced posteriorly one space (i.e., with only a single pterygiophore between neural spines 3 and 4, and two pteygiophores between neural spines 4 and 5) were accordingly adjusted.

	N/A	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Ad. desmonotus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	26	26	5
As. punctatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	9	2	-	-	-	-
C. purpurascens	-	-	-	-	-	-	-	-	-	-	-	-	8	1	-	-	-	-	-	-	-	-	-
C. zaps	-	-	-	-	-	-	-	-	-	-	-	-	11	3	-	-	-	-	-	-	-	-	-
L. atrofasciatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
L. cyclophthalmus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	21	-	-	-	-	-	-
L. lineatus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	10	-	-	-	-	-	-
M. alleni	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. paranox	13	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. polynemus	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. splendens	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
M. winterbottomi	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Og. novaehollandiae	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Og. queenslandiae	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Og. salvati	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ox. veliferus	-	-	-	-	-	-	-	-	-	-	-	-	7	1	-	-	-	-	-	-	-	-	-
Ph. marginata	-	-	-	-	-	-	-	-	-	-	-	-	8	1	-	-	-	-	-	-	-	-	-
Pi. aurifrons	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. coralensis	-	-	-	-	-	-	2	6	18	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. diadema	-	-	-	-	-	-	-	4	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. ephippiata	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. paccagnellae	-	-	-	-	-	-	2	10	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pi. porphyrea	-	-	-	-	-	-	-	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aldabraensis	-	16	8	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. alticaudex	-	-	-	-	-	1	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. andamanensis	-	-	-	-	-	6	9	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aureolineatus	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. aurulentus	-	-	-	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. bitaeniatus	-	-	-	-	1	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. caudalis	-	-	1	-	7	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. coccinicauda	-	-	-	-	-	-	-	1	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. colei	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cometes	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. cyanotaenia	-	-	-	-	-	-	-	3	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dilectus	-	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dixurus	-	6	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. dutoiti	-	-	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. elongatus	-	-	-	-	7	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flammicauda	-	-	-	-	-	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavivertex	-	7	4	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. flavopunctatus	-	-	-	-	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fowleri	-	-	-	-	-	-	12	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fridmani	-	-	-	-	1	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. fuscus	-	-	-	3	9	18	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. howsoni	-	-	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. jamesi	-	-	6	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kolythrus	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. kristinae	-	-	-	-	6	14	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. leucorhynchus	-	3	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. linda	-	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. litus	-	-	-	-	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. luteus	-	-	-	2	7	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. madagascariensis	-	-	-	-	-	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. magnificus	-	-	-	-	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. marshallensis	-	-	-	-	-	13	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melanurus	-	-	-	-	-	-	-	-	8	2	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. melas	-	-	-	-	17	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. mooii	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. moorei	-	-	1	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. natalensis	-	-	-	1	8	25	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. nigrovittatus	-	-	-	-	2	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. olivaceus	-	7	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. omanensis	-	-	-	4	9	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. persicus	-	-	2	6	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. perspicillatus	-	-	-	-	-	1	13	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pesi	-	-	-	-	6	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pictus	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. punctatus	-	-	-	1	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. pylei	-	-	-	-	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. quinquedentatus	-	-	7	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. ransonneti	-	-	-	-	-	4	9	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. reticulatus	-	-	-	-	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. sankeyi	-	-	-	-	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. springeri	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. steenei	-	1	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. striatus	-	-	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tapeinosoma	-	-	-	-	-	-	-	1	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. tauberae	-	5	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. viridis	-	-	-	-	-	-	-	1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Ps. wilsoni	-	2	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

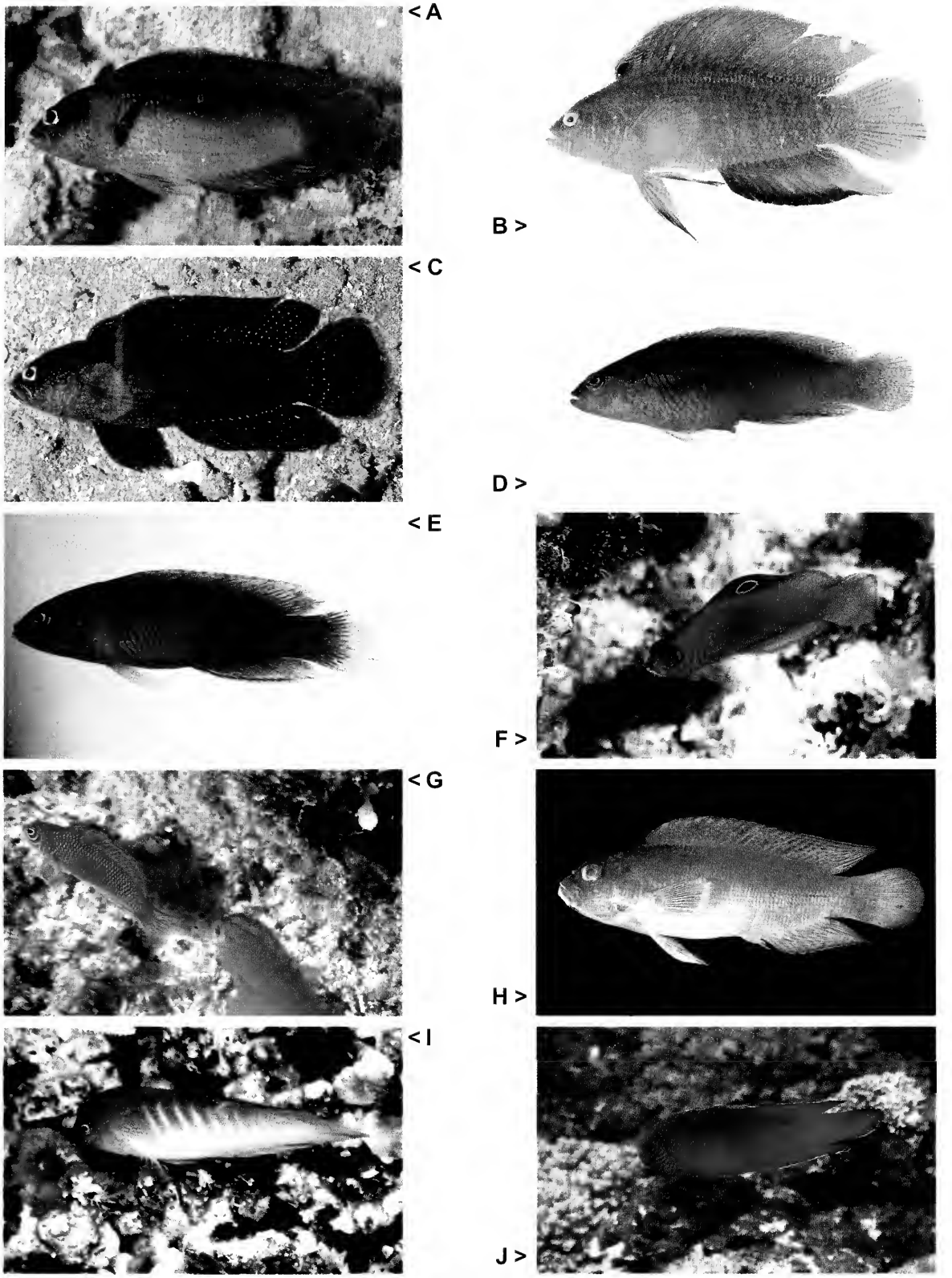


Plate 1. A). *Assiculoides desmonotus*, WAM P.31085-009, 46.6 mm SL, holotype, Western Australia (photo by J.B. Hutchins); B) *Assiculus punctatus*, WAM P.30165-005, 61.5 mm SL, Shark Bay, Western Australia (photo by J.B. Hutchins); C) *A. punctatus*, WAM P.31013-012, 43.0 mm SL, Western Australia (photo by J.B. Hutchins); D) *Cypho purpurascens*, female, New Caledonia (photo by R. Winterbottom); E) *C. purpurascens*, male, New Caledonia (photo by R. Winterbottom); F) *C. purpurascens*, male with dorsal-fin ocellus, underwater photo, Papua New Guinea (photo by R.H. Kuiter); G) *C. zaps*, BPBM 34228, 41.4 mm SL, male paratype, underwater photo, Indonesia (photo by J.E. Randall); H) *Labracinus cyclophthalmus*, BPBM 22292, 79.7 mm SL, putative female, Ryukyu Islands, Japan (photo by J.E. Randall); I) *L. cyclophthalmus*, underwater photo, Flores, Indonesia (photo by R.H. Kuiter); J) *L. cyclophthalmus*, underwater photo, Western Australia (photo by G.R. Allen).

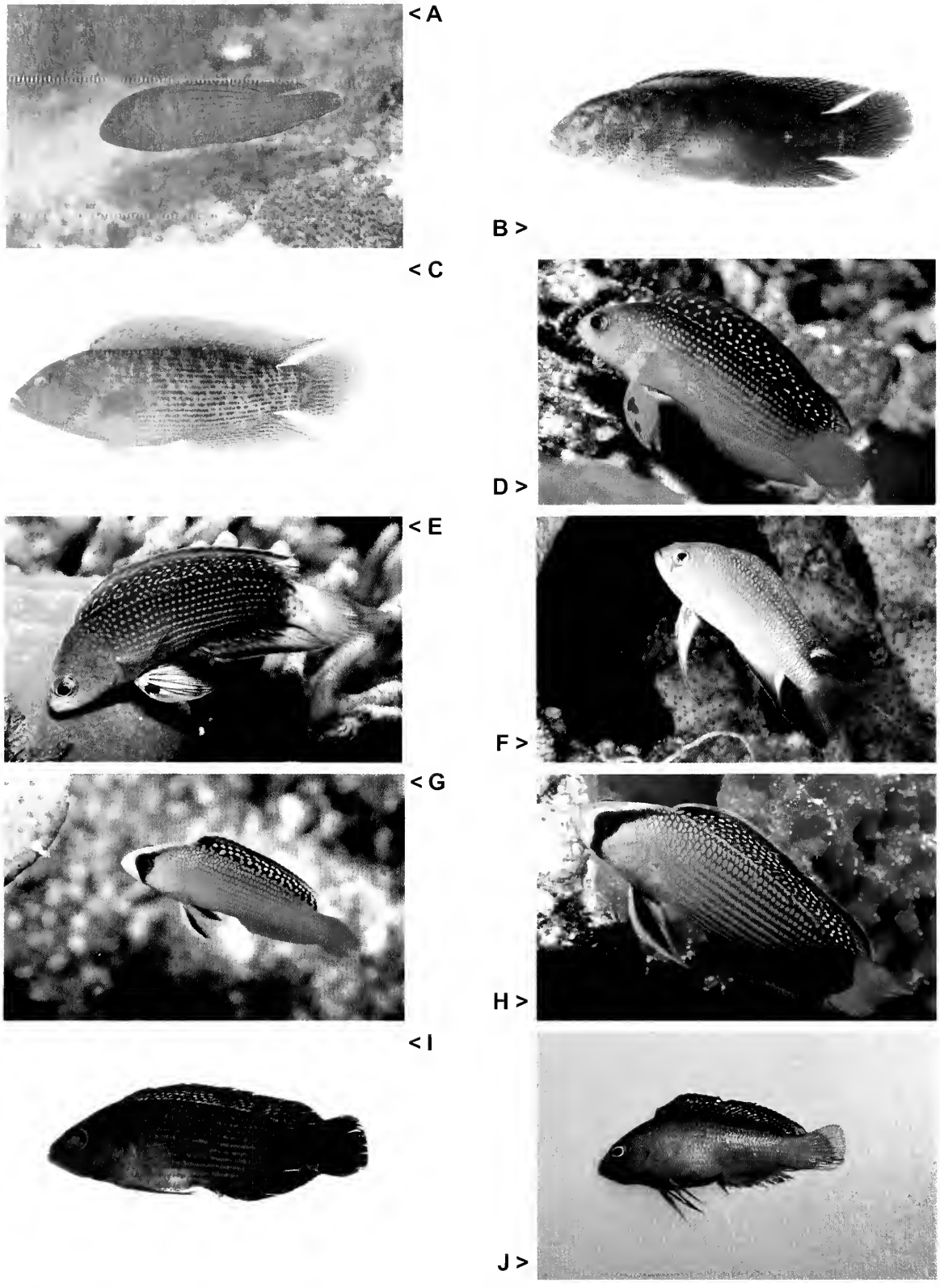


Plate 2. A) *Labracinus cyclophthalmus*, underwater photo, northern Borneo (photo by G.R. Allen); B) *L. lineatus*, BMNH 2000.5.17.2, 119.8 mm SL, putative female, Thevenard Island, Western Australia (photo by R.D. Mooi); C) *L. lineatus*, BMNH 2000.5.17.1, 142.7 mm SL, Serrurier Island, Western Australia (photo by R.D. Mooi); D) *Manonichthys alleni*, small individual, underwater photo, Sabah (photo by G.R. Allen); E) *M. alleni*, large individual, underwater photo, Sabah (photo by G.R. Allen); F) *M. polynemus*, underwater photo, Teluk Tomini, Sulawesi, Indonesia (photo by R.H. Kuiter); G) *M. splendens*, small individual, underwater photo, N of Sorong, Irian Jaya, Indonesia (photo by G. Barrall); H) *M. splendens*, large individual, underwater photo, NW of Sorong, Irian Jaya, Indonesia (photo by G. Barrall); I) *M.* cf. *splendens* (preserved), NTM S.11370-030, 42.1 mm SL, Scott Reef, Timor Sea, Australia (photo by R. Hobbs); J) *M.* cf. *splendens*, NTM S.11373-020, 29.9 mm SL, Scott Reef, Timor Sea, Australia (photo by B.C. Russell).

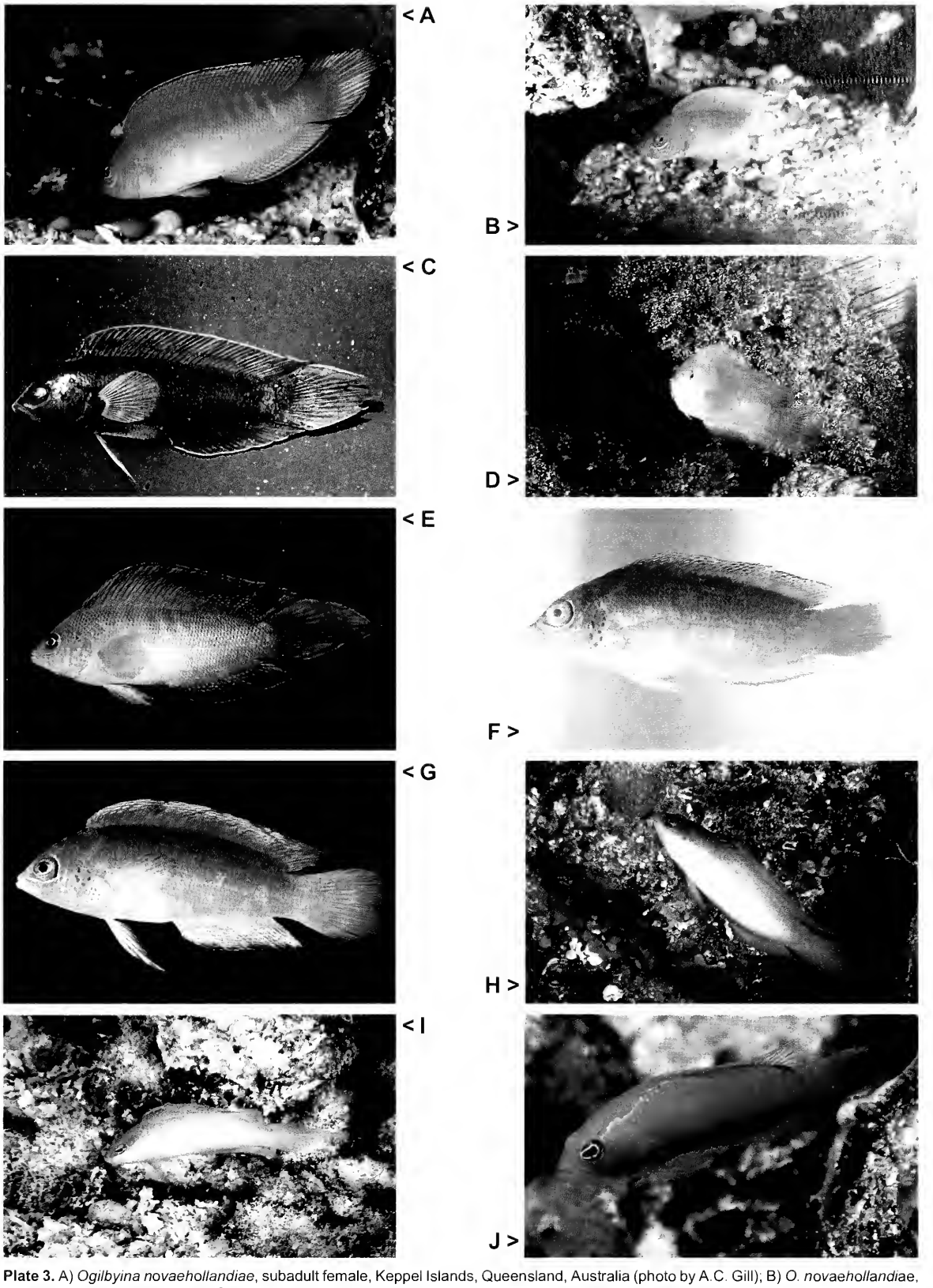


Plate 3. A) *Ogilbyina novaehollandiae*, subadult female, Keppel Islands, Queensland, Australia (photo by A.C. Gill); B) *O. novaehollandiae*, subadult male, Keppel Islands, Queensland, Australia (photo by A.C. Gill); C) *O. novaehollandiae*, AMS I.18280-001, 48.5 mm SL, adult male, One Tree Island, Great Barrier Reef, Australia (photo by R.H. Kuiter); D) *O. queenslandiae*, female, Great Barrier Reef, Australia (photo by A.C. Gill); E) *O. queenslandiae*, male, One Tree Island, Great Barrier Reef, Australia (photo by R.H. Kuiter); F) *O. salvati*, female?, Nouméa, New Caledonia (photo by J.T. Williams); G) *O. salvati*, BPBM 27155, 57.2 mm SL, male?, Nouméa, New Caledonia (photo by J.E. Randall); H) *Oxycercichthys veliferus*, grey-topped form, underwater photo, Great Detached Reef, Great Barrier Reef, Australia (photo by J.E. Randall); I) *O. veliferus*, yellow-topped form, underwater photo, Lizard Island, Great Barrier Reef, Australia (photo by R.H. Kuiter); J) *Pictichromis aurifrons*, underwater photo, near Biak Island, Irian Jaya, Indonesia (photo by G. Barrall).

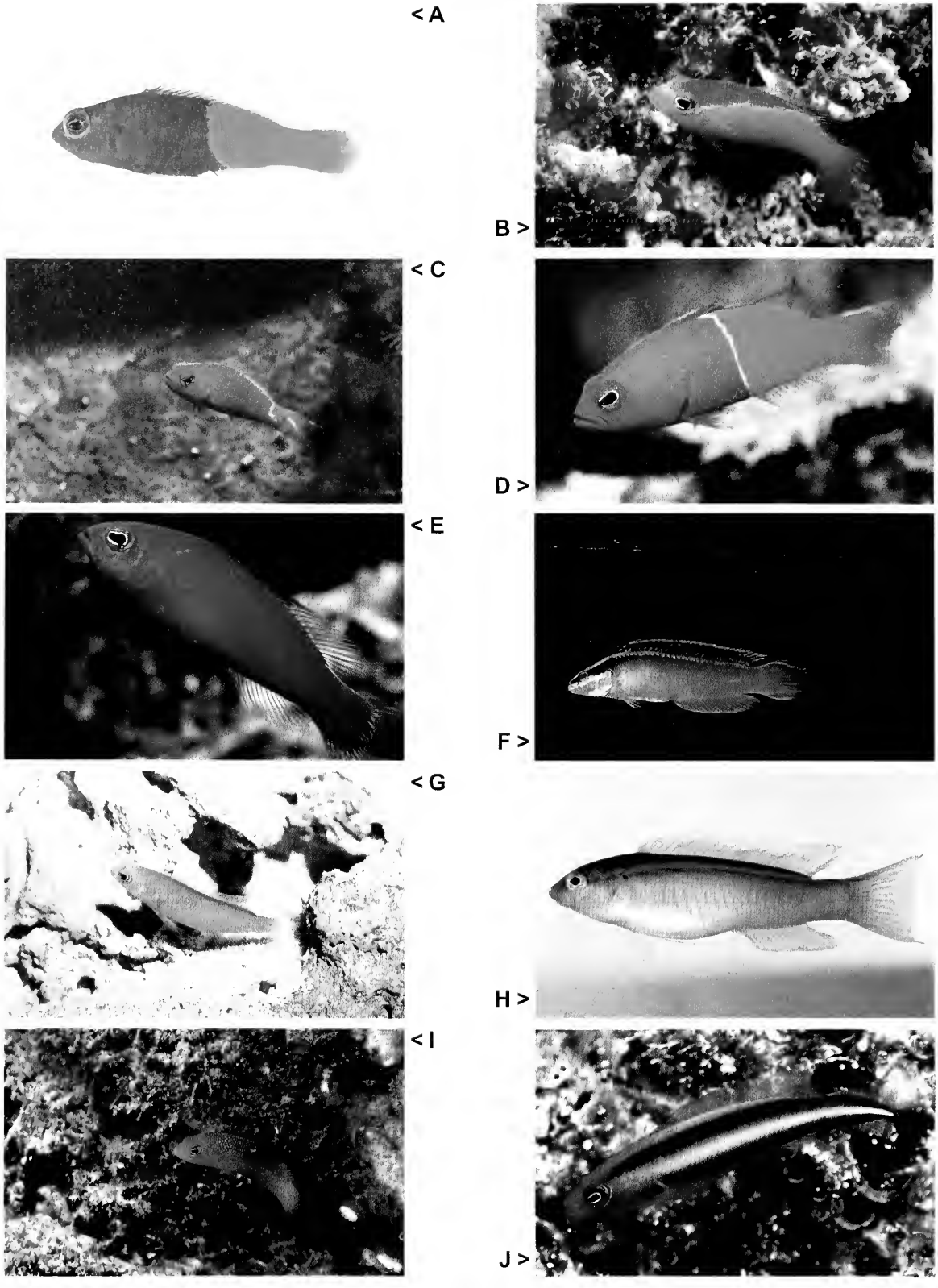
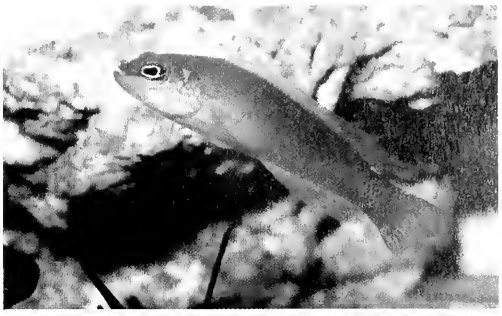
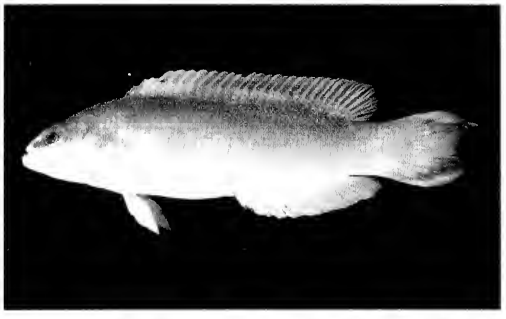
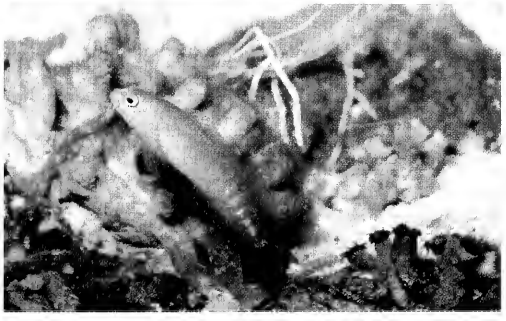


Plate 4. A) *Pictichromis coralensis*, ROM 72057, 39.1 mm SL, paratype, New Caledonia (photo by R. Winterbottom); B) *P. diadema*, underwater photo, Pulau Sipidan, Sabah (photo by R.H. Kuiter); C) *P. ephippiata*, underwater photo, off Manado, Sulawesi, Indonesia (photo by H. Debelius); D) *P. paccagnellae*, underwater photo, off Manado, Sulawesi, Indonesia (photo by G. Barrall); E) *P. porphyrea*, underwater photo, N of Sorong, Irian Jaya, Indonesia (photo by G. Barrall); F) *Pseudochromis aldabraensis*, BPBM 21254, 67.1 mm SL, east of Sitrah Island, Bahrain, Persian Gulf (photo by J.E. Randall); G) *P. andamanensis*, underwater photo, Similan Islands, Thailand (photo by R. Lubbock); H) *P. aureolineatus*, ROM 67394, 43.6 mm SL, holotype, Moheli, Comoro Islands (photo by R Winterbottom); I) *P. aurulentus*, BPBM 36506, 45.3 mm SL, holotype, underwater photo, Komodo Island, Indonesia (photo by J.E. Randall); J) *P. bitaeniatus*, striped form, underwater photo, near Biak Island, Irian Jaya, Indonesia (photo by G. Barrall).







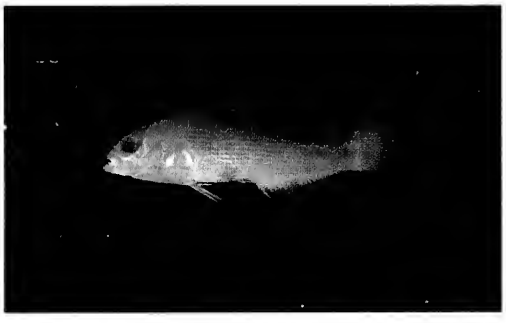


Plate 5. A) *Pseudochromis bitaeniatus*, BPBM 15625, 50.2 mm SL, indistinctly striped form, Alite Reef, Solomon Islands (photo by J.E. Randall); B) *P. caudalis*, small individual with non-striped caudal fin, underwater photo, near Karachi, Pakistan (photo by R. Lubbock); C) *P. caudalis*, BPBM 27710, 83.9 mm SL, Kerala, India (photo by J.E. Randall); D) *P. coccinicauda*, BPBM 33018, 39.4 mm SL, female, Maldive Islands (photo by J.E. Randall); E) *P. coccinicauda*, male, aquarium photo, Jakarta, Indonesia (photo by R. Lubbock); F) *P.* cf. *colei*, underwater photo, Boracay Island, Philippine Islands (photo by D. Eichler); G) *P. cyanotaenia*, MPM 32610, 39.0 mm SL, female, West Pilbara Islands, Western Australia (photo by R.D. Mooi); H) *P. cyanotaenia*, WAM P.27967-011, 50.3 mm SL, male, Fitzroy Reefs, Western Australia (photo by J.B. Hutchins); I) *P. dilectus*, BPBM 18841, 32.5 mm SL, Lively Rocks, Trincomalee, Sri Lanka (photo by J.E. Randall); J) *P. dixurus*, striped form, underwater photo, 95 km south of Mersa Alam, Egypt, Red Sea (photo by G. Barrall).

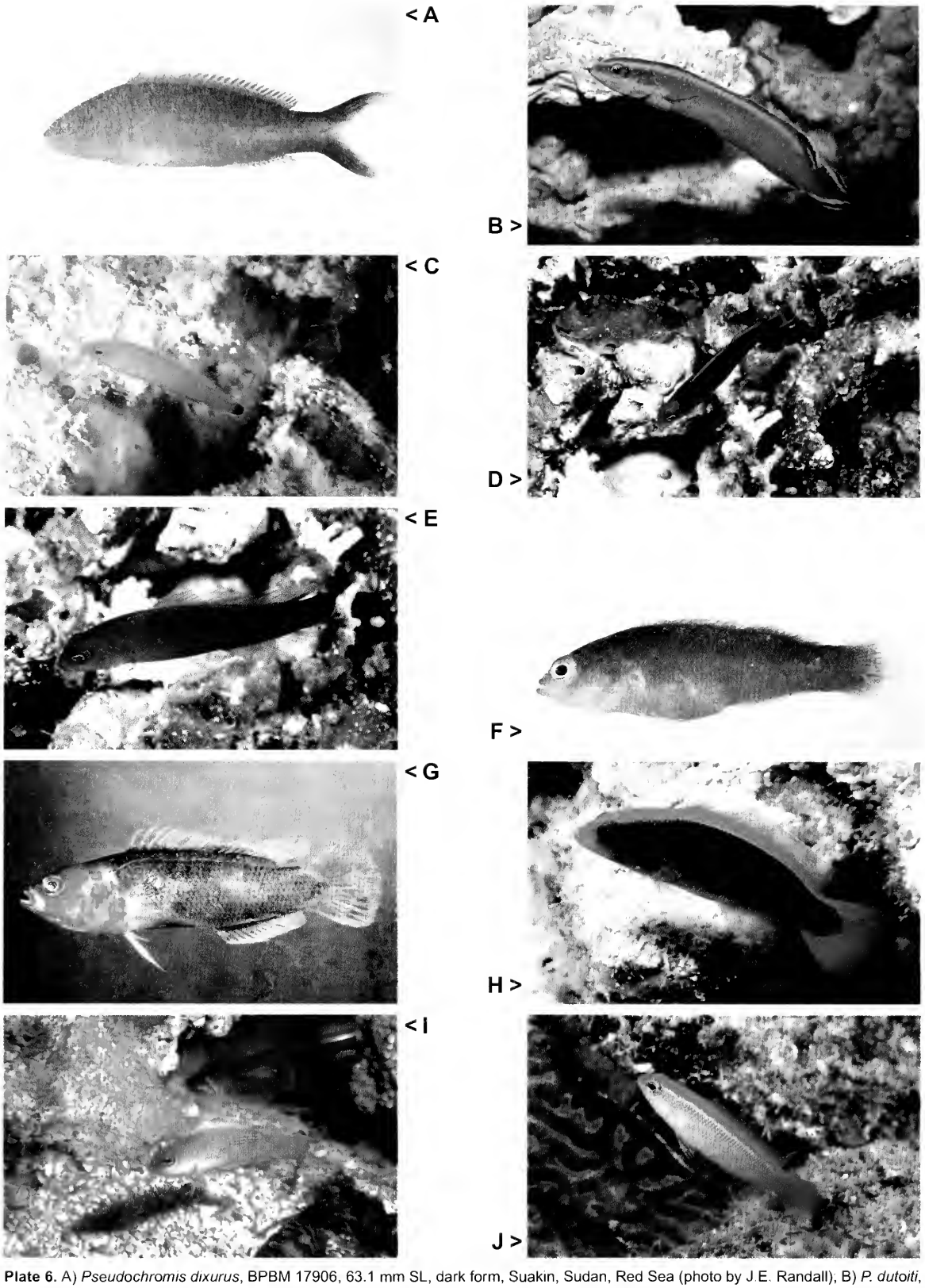


Plate 6. A) *Pseudochromis dixurus*, BPBM 17906, 63.1 mm SL, dark form, Suakin, Sudan, Red Sea (photo by J.E. Randall); B) *P. dutoiti*, aquarium photo, Kenya (photo by R. Lubbock); C) *P. elongatus*, approximately 25 mm SL, underwater photo, Batu Ata, Indonesia (photo by J.E. Randall); D) *P. elongatus*, underwater photo, Togian Island, Teluk Tomini, Sulawesi, Indonesia (photo by R.H. Kuiter); E) *P. elongatus*, underwater photo, Togian Island, Teluk Tomini, Sulawesi, Indonesia (photo by R.H. Kuiter); F) *P. flammicauda*, 38.6 mm SL, female, Lizard Island, Great Barrier Reef, Australia (photo by R. Winterbottom); G) *P. flammicauda*, 40.0 mm SL, male, Linnett Reef, Great Barrier Reef, Australia (photo by R.H. Kuiter); H) *P. flavivertex*, yellow-topped form, underwater photo, Hurghada, Egypt, Red Sea (photo by G. Barrall); I) *P. flavivertex*, blue-topped form, aquarium photo (photo by H. Debelius); J) *P. flavivertex*, yellow-topped individual with extensive white on flanks, underwater photo, Red Sea (photo by J.E. Randall).

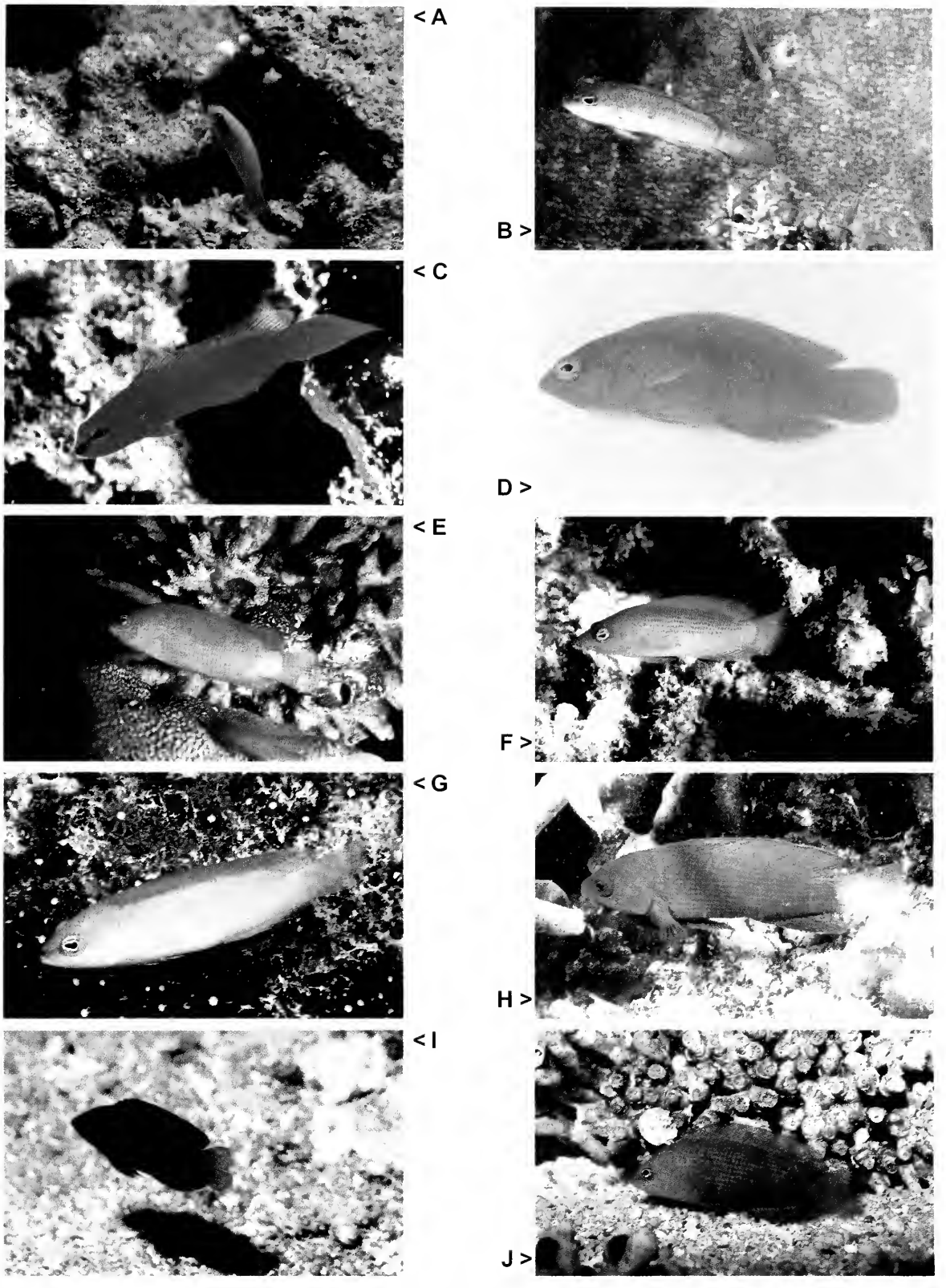


Plate 7. A) *Pseudochromis flavivertex*, xanthic form, underwater photo, Port Sudan, Sudan, Red Sea (photo by H. Debelius); B) *P. flavopunctatus*, BPBM 32417, 50.0 mm SL, paratype, underwater photo, off east coast of Komodo Island, Indonesia (photo by J.E. Randall); C) *P. fridmani*, underwater photo, island 63 km south-east of Ras Banas, Egypt, Red Sea (photo by G. Barrall); D) *P. fuscus*, WAM P.26631-009, 40.2 mm SL, north of Mangrove Bay, North West Cape, Western Australia (photo by G.R. Allen); E) *P. fuscus*, aquarium photo, One Tree Island, Great Barrier Reef, Australia (photo by A.C. Gill); F) *P. fuscus*, underwater photo, Kawe Island, Waigeo, Indonesia (photo by J.E. Randall); G) *P. fuscus*, underwater photo, Flores, Indonesia (photo by R.H. Kuiter); H) *P. fuscus*, underwater photo, Lizard Island, Great Barrier Reef, Australia (photo by R.H. Kuiter); I) *P. fuscus*, underwater photo, off north-eastern Sulawesi, Indonesia (photo by J.E. Randall); J) *P. fuscus*, aquarium photo, Indonesia (photo by R. Lubbock).

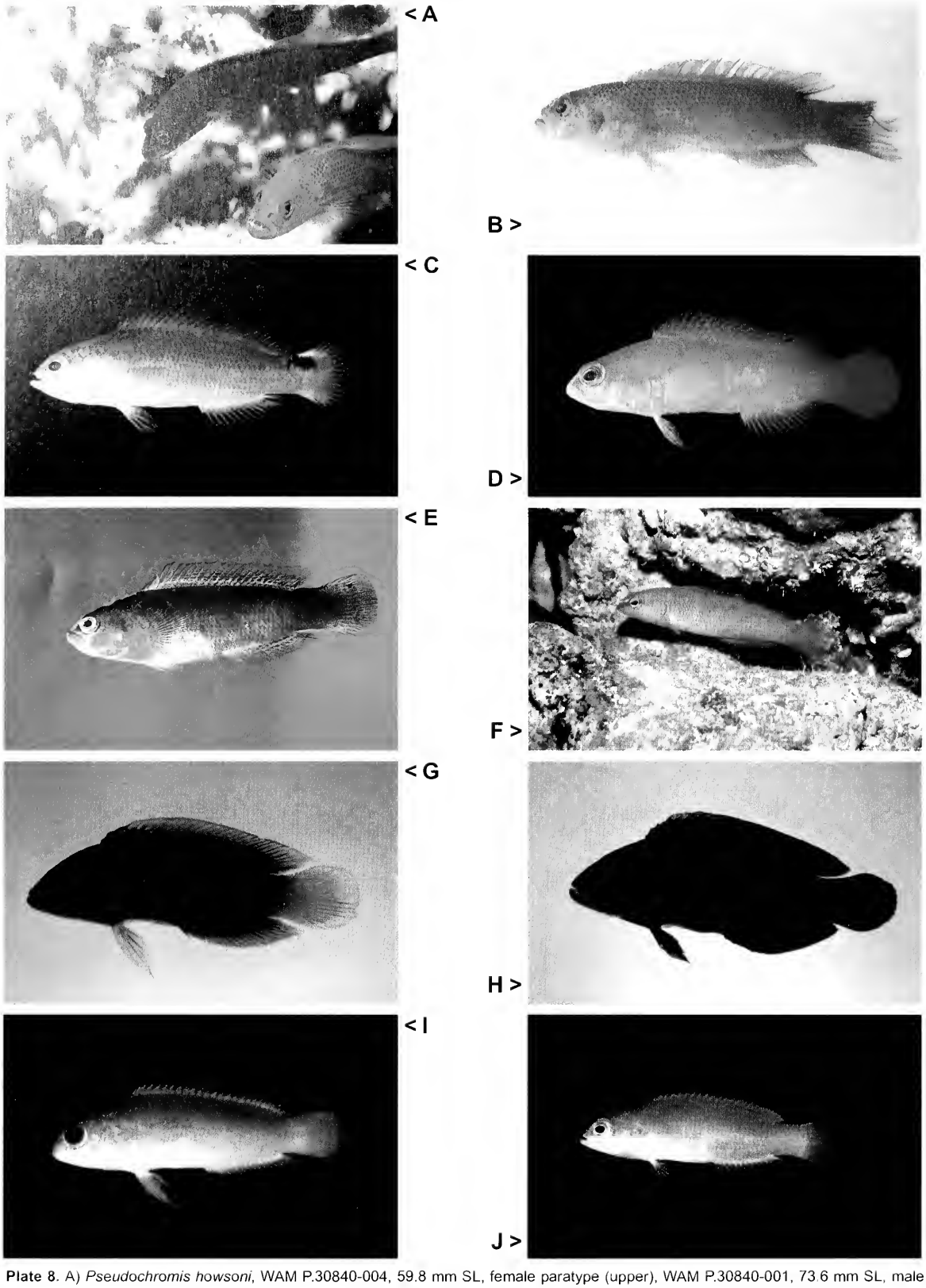


Plate 8. A) *Pseudochromis howsoni*, WAM P.30840-004, 59.8 mm SL, female paratype (upper), WAM P.30840-001, 73.6 mm SL, male holotype (lower), underwater photo, Ashmore Reef, Timor Sea (photo by G.R. Allen); B) *P. howsoni*, WAM P.26283-002, 61.8 mm SL, west of Cape Missiessy, Western Australia (caudal fin damaged) (photo by J.B. Hutchins); C) *P. jamesi*, BPBM 21730, 39.0 mm SL, female, New Caledonia (photo by J.E. Randall), D) *P. jamesi*, BPBM 27114, 43.4 mm SL, male, New Caledonia (photo by J.E. Randall); E) *P. kristina*e, RUSI 46567, 56.1 mm SL, paratype, Mozambique (photo by P.C. Heemstra), F) *P. leucorhynchus*, BMNH 1975.2.12.8-9, 51.5 mm SL, paratype, underwater photo, Kenya (photo by R. Lubbock); G) *P. linda*, BPBM 30487, 42.3 mm SL, holotype, Persian Gulf (photo by J.E. Randall); H) *P. linda*, BPBM 30131, 55.3 mm SL, paratype, Persian Gulf (photo by J.E. Randall); I) *P. litus*, BPBM 34562, 54.1 mm SL, paratype, Indonesia (photo by J.E. Randall); J) *P. luteus*, BPBM 23381, 36.0 mm SL, female, Taiwan (photo by J.E. Randall).

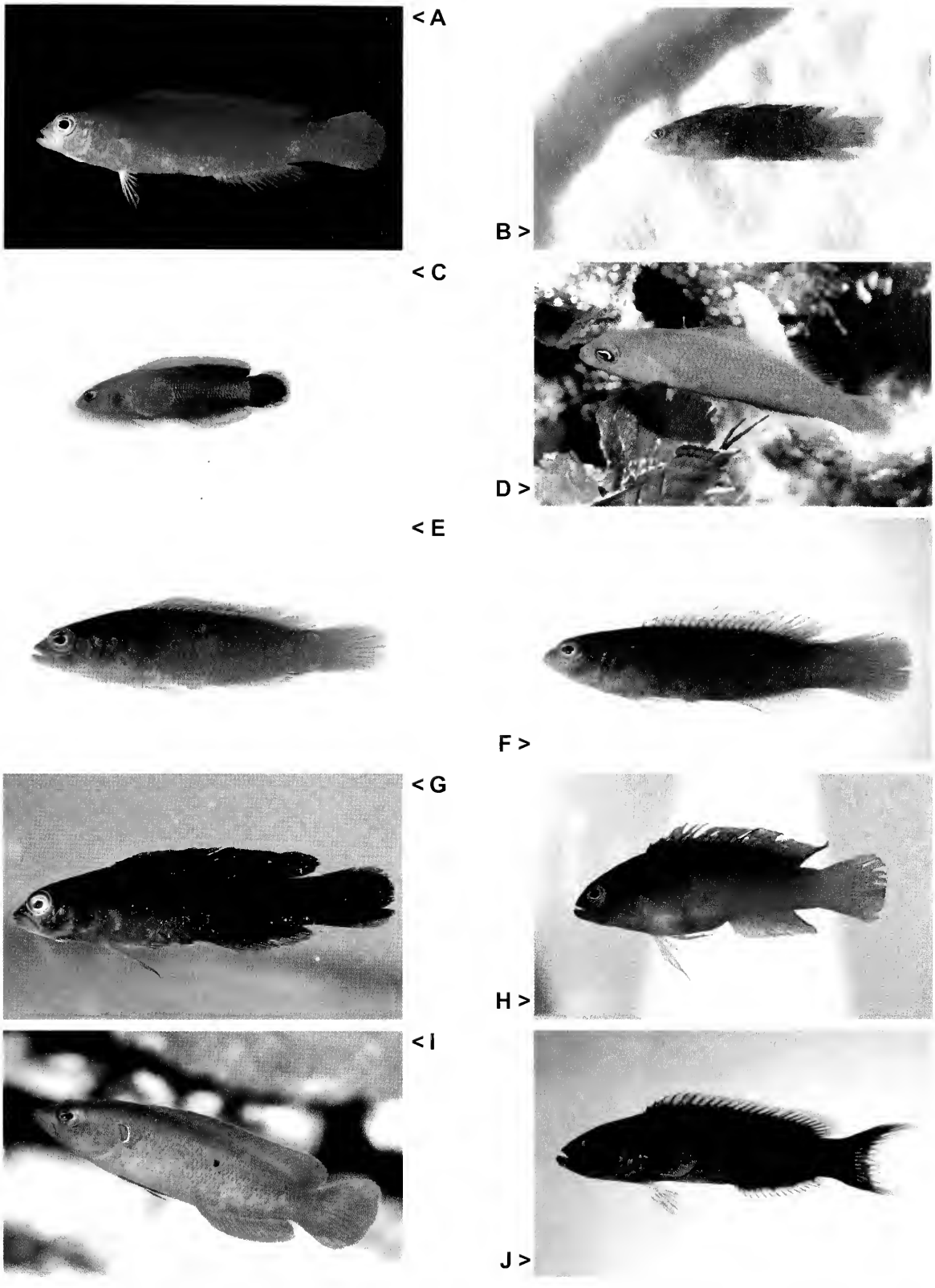


Plate 9. *A) Pseudochromis luteus, BPBM 23354, 46.1 mm SL, male, Ch'uan-fan-shih, Taiwan (photo by J.E. Randall); B) P. magnificus, female, Cargados Carajos (photo by O. Nordlinger); C) P. magnificus, male, Cargados Carajos (photo by V.G. Springer); D) P. marshallensis, underwater photo, 135 km north of Sorong, Irian Jaya, Indonesia (photo by G. Barrall); E) P. marshallensis, MPM 32611, 36.5 mm SL, Bessieres Island, West Pilbara Islands, Western Australia (photo by R.D. Mooi); F) P. melanurus, ROM 46833, 26.0 mm SL, paratype, female, Great Astrolabe Reef, Fiji (photo by R. Winterbottom); G) P. melanurus, USNM 334246, 36.3 mm SL, paratype, male, south of Ohonna Harbour, Eua Island, Tonga (photo by J.T. Williams); H) P. melas, RUSI 16060, 41.1 mm SL, pale form, Leadmans Shoal, Natal South Africa (photo by P.C. Heemstra); I) P. melas, dark form, underwater photo, Sodwana Bay, Natal South Africa (photo by G.R. Allen); J) P. moorei, BPBM 28606, 84.6 mm SL, female, Dumaguete, Negros, Philippine Islands (photo by J.E. Randall).*

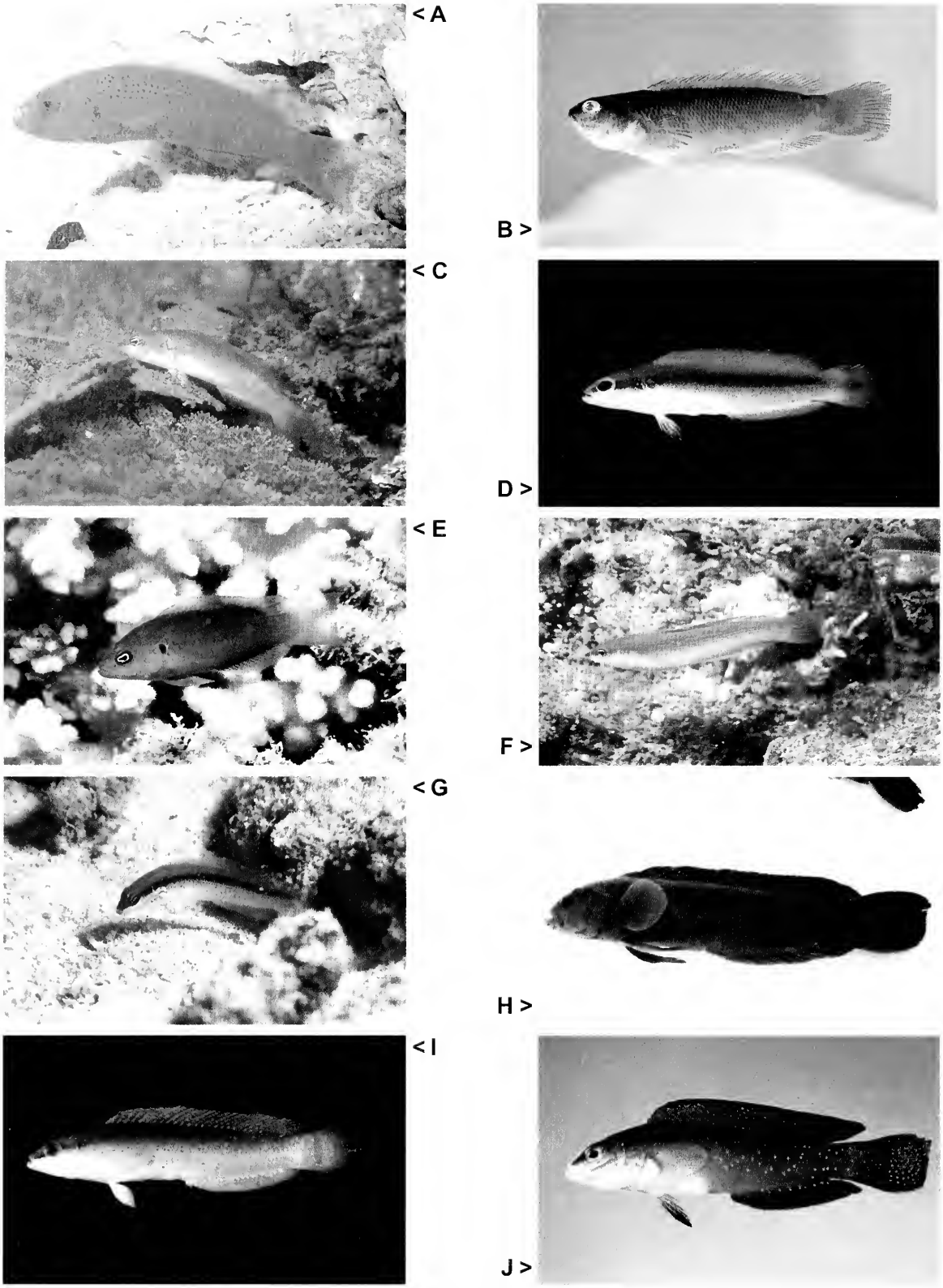


Plate 10. *A) Pseudochromis moorei*, male, aquarium photo, between Cabulan and Vandanon Islands, Cebu Strait, Philippine Islands (photo by R. Lubbock); B) *P. natalensis*, RUSI 44743, 64.5 mm SL, Clives Reef, Aliwal Shoal, Natal, South Africa (photo by P.C. Heemstra); C) *P. nigrovittatus*, non-striped form, underwater photo, Salalah, Oman (photo by H. Debelius); D) *P. nigrovittatus*, 42.0 mm SL, striped form, Muscat, Oman (photo by J.E. Randall); E) *P. olivaceus*, underwater photo, 98 km SSE of Hurghada, Egypt (photo by G. Barrall); F) *P. omanensis*, underwater photo, Sudah, southern Oman (photo by J.E. Randall); G) *P. omanensis*, underwater photo, Masirah Island, Oman (photo by J.E. Randall); H) *P. omanensis*, Sudah, southern Oman (photo by J.E. Randall); I) *P. persicus*, 69.0 mm SL, off Muarraq Island, Bahrain, Persian Gulf (photo by J.E. Randall); J) *P. persicus*, 60.0 mm SL, dark form, Bahrain, Persian Gulf (photo by J.E. Randall).

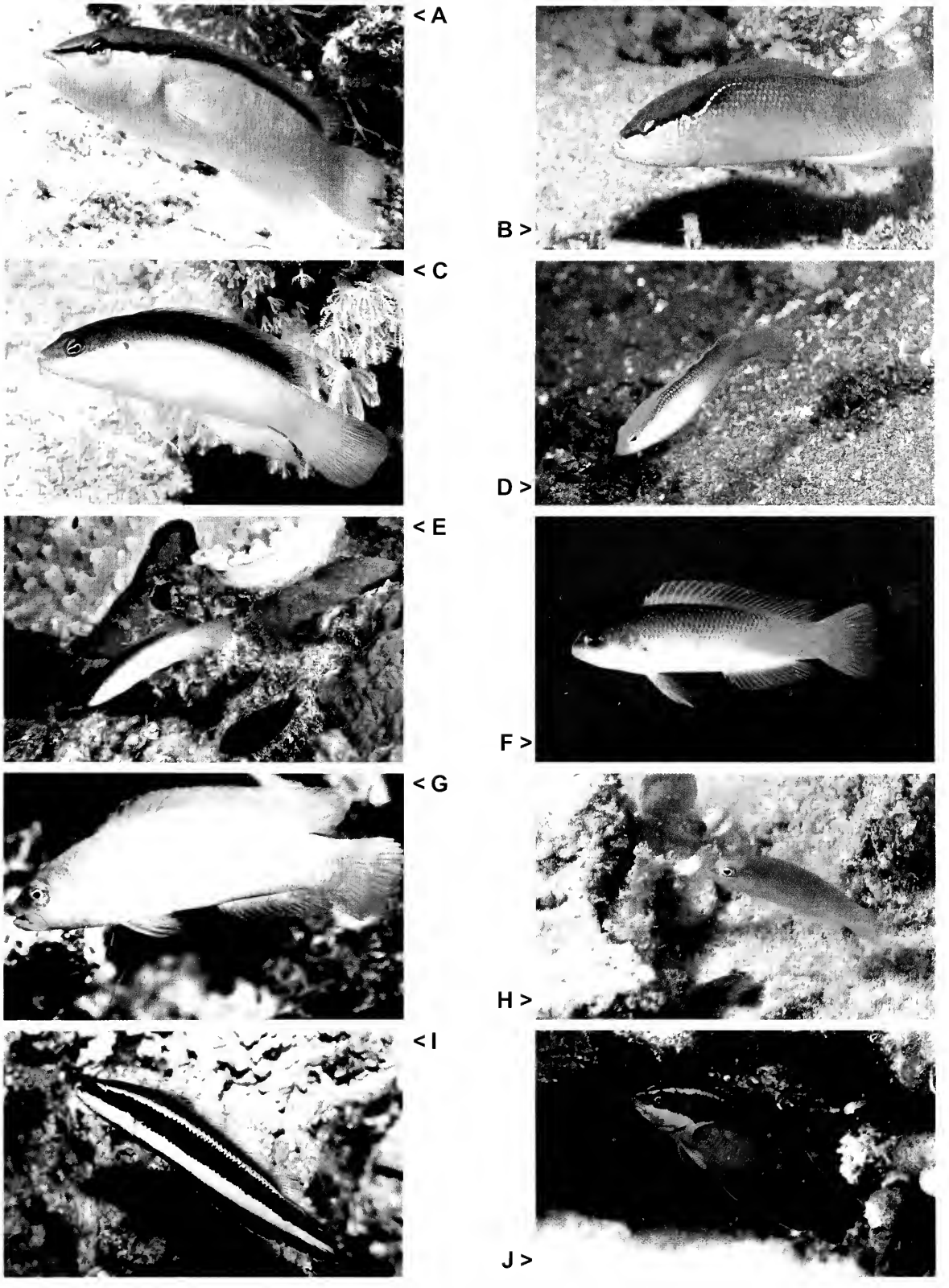


Plate 11. A) *Pseudochromis perspicillatus*, underwater photo, 65 km north of Sorong, Irian Jaya, Indonesia (photo by G. Barrall); B) *P. perspicillatus*, WAM P.30772-001, 77.9 mm SL, underwater photo, between Rinca and Kode Islands, Indonesia (photo by G.R. Allen); C) *P. pesi*, underwater photo, 17 km south of Hurghada, Egypt, Red Sea (photo by G. Barrall); D) *P. pictus*, BPBM 37349, 50.3 mm SL, holotype, underwater photo, Alor Island, Indonesia (photo by J.E. Randall); E) *P. punctatus*, underwater photo, southern Oman (photo by J. Hoover); F) *P. pylei*, BPBM 31485, 52.0 mm SL, holotype, Kadola Island, Indonesia (photo by J.E. Randall), G) *P. quinquedentatus*, underwater photo, Magnetic Island, Queensland, Australia (photo by R.H. Kuiter); H) *P. ransonneti*, approximately 35 mm SL, underwater photo, northern Gulf of Thailand (photo by J.E. Randall); I) *P. sankeyi*, BMNH 1973.12.20.104, 55.5 mm SL, holotype, aquarium photo, Massawa, Eritrea, Red Sea (photo by R. Lubbock) J) *P. springeri*, underwater photo, 1 km south of Hurghada, Egypt, Red Sea (photo by G. Barrall).

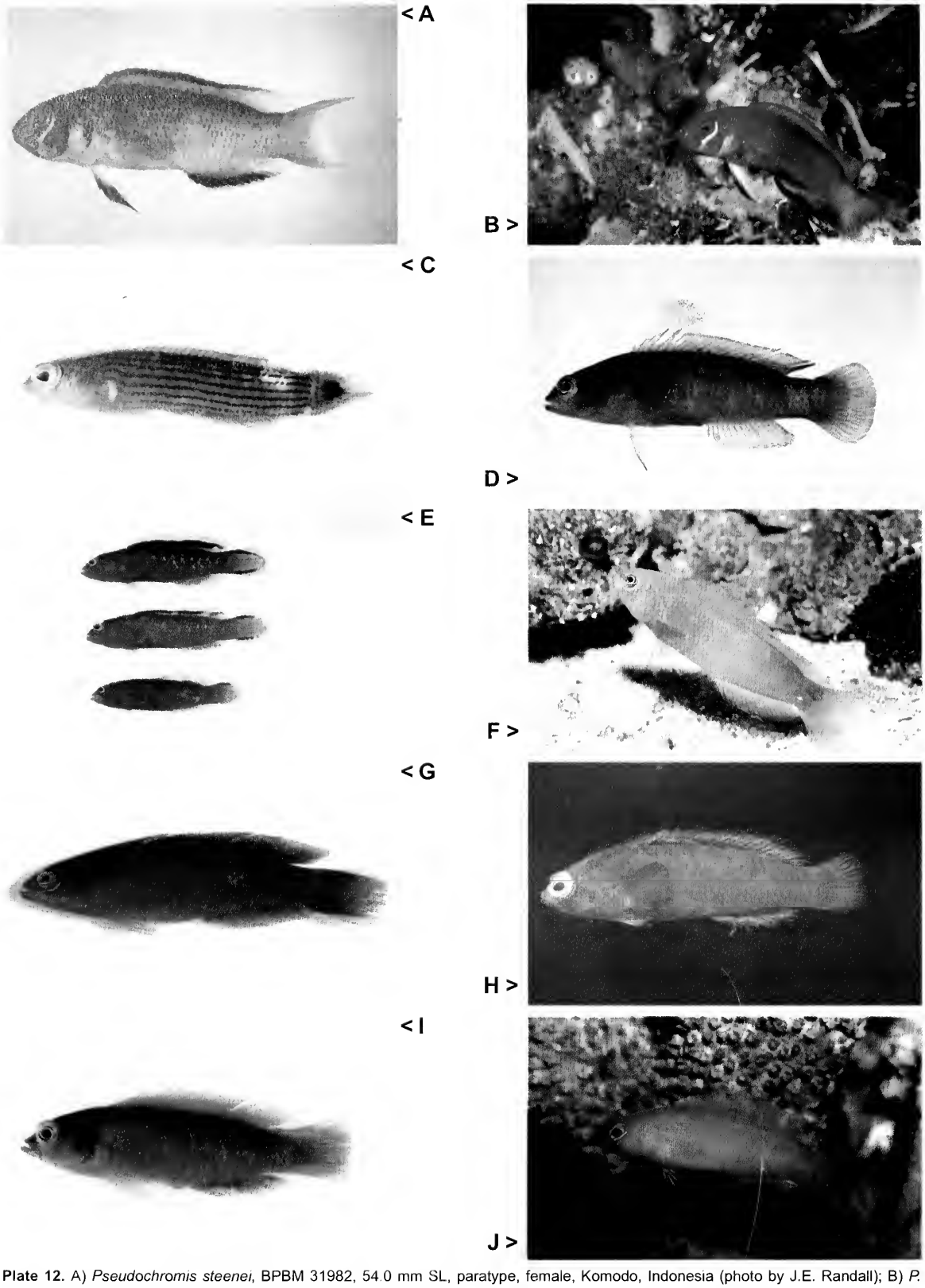


Plate 12. A) *Pseudochromis steenei*, BPBM 31982, 54.0 mm SL, paratype, female, Komodo, Indonesia (photo by J.E. Randall); B) *P. steenei*, BPBM 34566, 57.8 mm SL, holotype, male, underwater photo, Bali, Indonesia (photo by J.E. Randall); C) *P. striatus*, USNM 352601, 29.9 mm SL, Ishigaki Island, Japan (photo by J.T. Williams); D) *P. tapeinosoma*, ROM uncat., 34.0 mm SL, female, Andaman Sea, Thailand (photo by R. Winterbottom); E) *P. tapeinosoma*, WAM P.29624-045, 28.0-34.0 mm SL, males, Madang, Papua New Guinea (photo by G.R. Allen); F) *P. tauberae*, BMNH 1975.2.12.10, 63.4 mm SL, holotype, Shanzu, Kenya (photo by R. Lubbock); G) *P. tauberae*, ROM uncat., 55.0 mm SL, Comores Islands (photo by R. Winterbottom); H) *P. viridis*, WAM P.29331-013, 41.1 mm SL, holotype, male, Christmas Island, Indian Ocean (photo by G.R. Allen); I) *P. wilsoni*, MPM 32612, 40.4 mm SL, female, north-west of Serrurier Island, Western Australia (photo by R.D. Mooi); J) *P. wilsoni*, male, aquarium photo, Queensland, Australia (photo by R. Lubbock).

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